WYOMING

AQUATIC INVASIVE SPECIES

FIRE EQUIPMENT INSPECTION

AND DECONTAMINATION MANUAL

Revised 2019

Guidelines in this manual are based on the National Wildfire Coordination Group “Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations” and will be modified annually as necessary.

Sky Crane with Dipping Snorkel Assembly

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What are Aquatic Invasive Species (AIS)?

"Aquatic invasive species means exotic or nonnative aquatic organisms that have been determined by the [Game and Fish] Commission to pose a significant threat to the aquatic resources, water supplies or water infrastructure of the state" as stated in the 2010 Wyoming Aquatic Invasive Species Act.

Aquatic invasive species (AIS) are also called aquatic nuisance species, nonnative species, exotic species, non-indigenous species, weeds, or pests. They can be plants, such as hydrilla or Eurasian watermilfoil, or animals such as zebra and quagga mussels or rusty crayfish. Invasive aquatic plants have adapted to living in, on, or next to water, and can grow either submerged or partially submerged in water. Invasive aquatic animals require a watery habitat, but do not necessarily have to live entirely in water.

Aquatic invasive species threaten native species and interfere with recreation, aquatic food webs, municipal, commercial, and agricultural water supply and distribution. In their native environments, invasive species are typically held in check and controlled by predators, parasites, pathogens, or competitors. However, when they are transported to a new environment, the natural checks are usually left behind, giving invasives an advantage over native species and making them very difficult, if not impossible, to control.

What is the purpose of this AIS Fire Equipment Inspection and Decontamination (FEID) manual?

This manual outlines standard Fire Equipment Inspection and Decontamination (FEID) procedures to be followed by authorized AIS inspectors to prevent the spread of AIS into and within Wyoming. While this manual emphasizes the two most threatening AIS to Wyoming, zebra and quagga mussels, the procedures apply to all AIS. The procedures in this manual apply to pieces of fire equipment of any and all kinds. It includes vehicles, pumps, motors, trailers, compartments and any other associated equipment or containers that routinely or reasonably could be expected to contain or have come in contact with raw water.

What are zebra and quagga mussels?

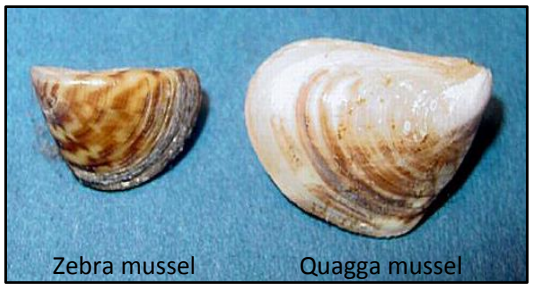


Photo by USGS

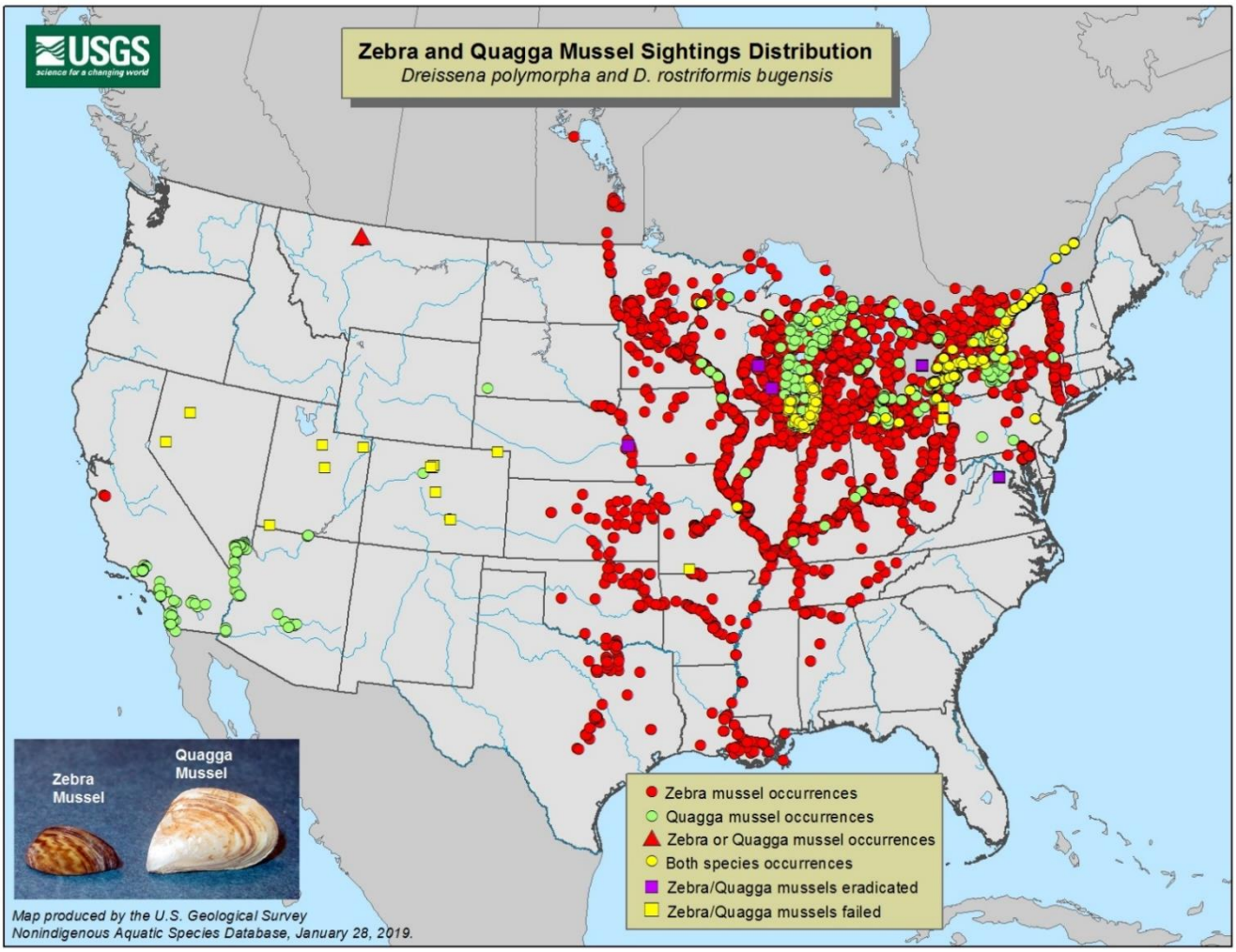
Zebra and quagga mussels are freshwater bivalve mollusks (animals with two shells). It is very difficult to tell the two species apart in the field. The shell color of both mussels varies from a yellowish to darker brown, often forming stripes. Larvae are microscopic whereas adults can reach up to two inches long. The zebra mussel is nearly triangular in shape and the quagga mussel is more rounded. Unlike native North American freshwater mussels, which burrow in soft sediment, adult zebra and quagga mussels can attach to hard surfaces using small byssal threads.

Both zebra and quagga mussels can survive cold waters, but cannot tolerate freezing. They can endure temperatures between 33° F and 86°F (1°and 30°C). Zebra mussels need temperatures above 54°F (12°C) to reproduce while quagga mussels can reproduce in waters as cold as 48°F (9°C). The embryos are microscopic. The larvae, called veligers, are planktonic and free-floating. The veligers float in the water column or are carried in the current for about four to eight weeks. The larvae develop shells and settle onto any solid surface, including the skin or shells of native aquatic species. Zebra mussels are native to the Black and Caspian Seas. They were discovered in the Great Lakes in 1988 and have since spread to 34 states in the United States. Quagga mussels are native to the Dnieper River Drainage in the Ukraine, and were first found in the Great Lakes in 1989.

How did the mussels get to North America?

Zebra and quagga mussels were likely introduced into the Great Lakes in the discharged ballast water of ocean-going ships. They likely made their way to the western United States on trailered watercraft. Invasive mussels are now currently found in most of the eastern states, and some western states, such as Colorado, Utah, Nebraska, Montana, California, Arizona, and Nevada. The U.S. Geological Survey (USGS) updates an occurrence map for both species at http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/).

Aquatic invasive species can inadvertently hitch rides to other bodies of water on fire equipment (engines, aircraft, pumps, tanks, buckets, and draft hoses).



Distribution of Zebra and Quagga Mussels in the United States, as of January 2019.

Are quagga and zebra mussels in Wyoming?

These organisms have not been documented in Wyoming, but are present in several bordering states including Utah, Colorado, South Dakota, and Nebraska. New mussel populations were discovered in Nebraska, South Dakota and several other Midwest states in 2018.

Why should we be concerned about zebra and quagga mussels?

Zebra and quagga mussels pose a great ecological and economic threat to the state. The invasion of these mussels can affect every Wyoming water user in some way. The impacts could be devastating.

They grow and reproduce quickly.
Zebra and quagga mussels reproduce *exponentially*. They can spawn year-round if conditions are favorable. A single female mussel can produce up to one million eggs a year. Even if only ten percent of the offspring survive, there would be 10 septillion mussels in the waterway at the end of five years! As the mussel population explodes, they cover the bottom and sides of the waterway.

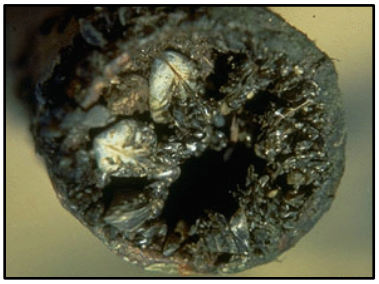


Photo by Craig Czarnecki

They clog water infrastructure, impacting water supply and quality.
Zebra and quagga mussels can attach via byssal threads to hard surfaces. They attach to most underwater structures and can form dense clusters that impair facilities and impede the flow of water. They clog intake pipes and trash screens, canals, aqueducts, and dams—disrupting water supplies to homes, farms, factories, and power plants. Zebra and quagga mussels filter water which leads to increased clarity. However, over time the increased clarity can encourage plant growth which later leads to degraded water quality and can alter the taste and smell of drinking water.

They have significant ecological impacts.
Invasive species have the ability to change aquatic ecosystems and native plant and animal communities. The amount of food the mussels eat and the waste they produce has life-altering effects on the ecosystem and can harm fisheries. As filter feeders, these species remove large amounts of microscopic plants and animals that form the base of the food chain, leaving little or nothing for native aquatic species. Zebra mussels attach to and encrust native organisms, essentially smothering them and removing more animals from the food chain.


Photo by Ontario Ministry of Natural Resources

They have recreational impacts.
These mussels encrust docks, dams, and any other underwater surface in affected waters. Small mussels can get into engine cooling systems of watercraft causing overheating and damage. The weight of attached mussels can sink navigational buoys. Zebra and quagga mussels also impact fish populations and reduce sport-fishing opportunities. Their sharp shells can cut the feet of unsuspecting swimmers and beach goers.

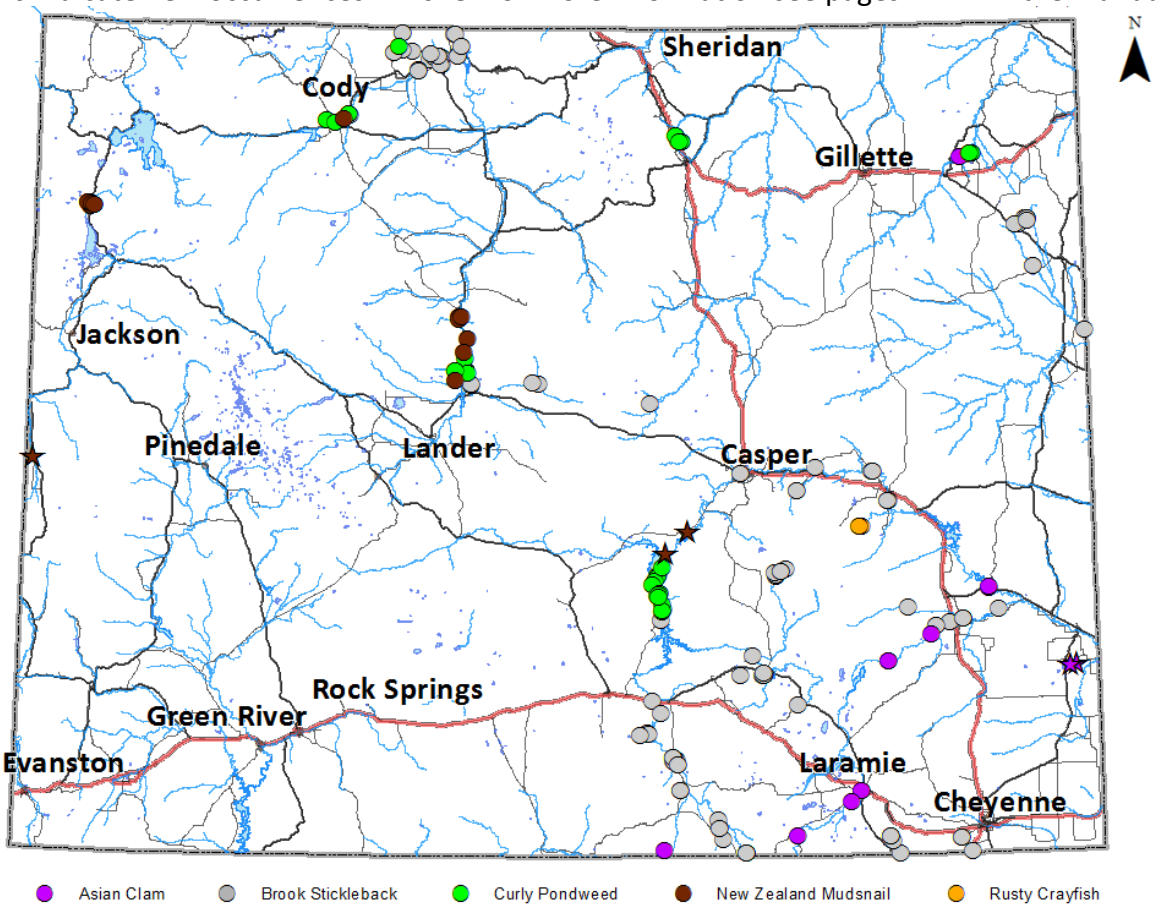
They have substantial economic impacts.
As maintenance costs for power plants, water treatment facilities and water delivery infrastructures increase, so does the cost of food and utilities. In the Great Lakes area, maintenance costs in water treatment plants, power plant intakes and dams have been in the billions of dollars. The destruction of sport and commercial fisheries also has a wider economic impact in terms of lost tourism and recreation dollars. Estimated annual costs for mussel control in western states are $1 million per large hydropower facility and $40,000 per municipal water supply system.

They are very difficult to eliminate.
In only two instances have managers been able to eradicate zebra mussels. In Virginia, a large volume of chemical was used to treat a small, unconnected pond to kill the adults and larvae. Managers in Nebraska drained Lake Zorinsky, a 255 acre public lake, for a year, allowing the winter temperatures to freeze out the zebra mussels but these attempts were unsuccessful. Eradicating or treating zebra or quagga mussels in large water bodies or connected waterways in not likely, so prevention is critical.

They spread quickly to other water bodies.
Mussels can spread to other bodies of water by attaching to fire equipment in contact with known AIS waterways. They can live up to 30 days out of the water depending on local conditions which allows them to be transported long distances. Larvae can be transported in water inside tanks, pumps, draft hoses and foot valves. Mussel larvae also disperse naturally and can be carried downstream or through water diversions to other lakes and reservoirs.

Does Wyoming have any aquatic invasive species?

Yes. There are several AIS in Wyoming, such as New Zealand mudsnails, Asian clam, rusty crayfish, and curly pondweed. These species may cause harm to aquatic ecosystems in Wyoming and it is critical that we prevent them from spreading to new waters. The map below shows the distribution of AIS populations in Wyoming as of 2018; stars indicate new occurrences in 2018. For more information see pages 14-17 in the manual.



What can I do to prevent the introduction of AIS?

Reference the AIS operational guidelines for fire activities (Appendix H) on preventing the introduction of AIS when moving between Wyoming waters. Equipment entering Wyoming from out of state should be inspected, and decontaminated if needed.

How do I know if a waterway is positive for AIS?

Review the list of high risk waters across the United States (Appendix A). Additionally, waters positive for AIS are often posted at access points. Firefighters can access Wyoming specific information on the National Interagency Fire Center site located at: https://www.frames.gov/partner-sites/fire-operations-maps/wyoming/. If conducting firefighting operations out of state, consider reviewing the water's agency website for information or asking for information during your visit. If you are ever in doubt, have equipment inspected in Wyoming before you begin operations involving waterways.

Is it mandatory to get my fire equipment inspected?

If your fire equipment has been in contact with high risk water (a water known or suspected to be positive for zebra or quagga mussels; see Appendix A) within the last 30 days OR if you are transporting fire equipment into Wyoming from out of state from March 1 through November 30, you are required to have your fire equipment inspected prior to drafting from or utilizing waterways in Wyoming.

How do I document my fire equipment has been inspected?

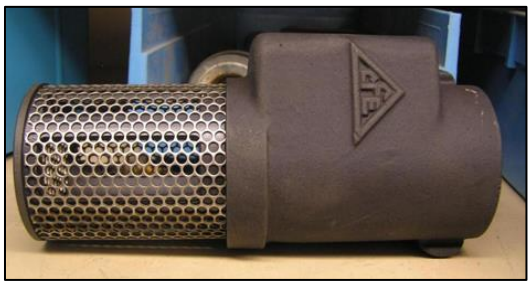
Wyoming authorized AIS inspectors must complete the *Fire Equipment Inspection and Decontamination (FEID) Report* (page 9). The form can also be submitted online at: https://forms.gle/81iTNEJFsio4fqh79

What happens if my fire equipment needs to be decontaminated?

Fire engine plumbing

If the equipment was used in a zebra/quagga positive water in the last 30 days, it must be thoroughly decontaminated. An authorized decontaminator will spray the exterior and flush the interior compartments with scalding (120-140°F) water to remove and kill any AIS that may be on the fire equipment. After decontamination, the fire equipment will be inspected again to ensure the decontamination was successful. Fire equipment that is found to harbor AIS may require a quarantine period to kill any AIS not killed during decontamination. If the equipment was not used in a positive water, follow the best management practices and guidance provided in this manual.

Can I disinfect my fire equipment using chemicals?



Drafting foot valve strainer

The use of some chemical disinfectants is a reliable method to kill and eliminate most AIS. Quaternary ammonium compounds ("Quat") are safe for MOST gear and equipment when used at recommended concentrations and rinsed (See Appendix H). However, quaternary ammonium compounds did not meet corrosion requirements for aluminum and **should not be used in aircraft or associated equipment** (e.g. fixed-tank helicopters or air tankers**).** Quat products are safe for ground-based tanker equipment.

Chlorine based products, such as bleach, should not be used because of their corrosiveness to fabrics, plastics, rubber, and metal. Additionally chlorine chemical reaction with common fire compounds can also pose safety concerns (See Little Queens Incident; Appendix B). Also follow all environmental regulations associated with disposal of all chemicals used with decontamination protocols.

What are the Best Management Practices for dealing with AIS and Fire Equipment?

Preventing exposure to AIS through best management practices is the easiest and simplest way to control their spread.

- Refer to the Wyoming Dispatch Zone maps with distributions of AIS in Wyoming available at: https://www.frames.gov/partner-sites/fire-operations-maps/wyoming/. You can never be certain that invasives are NOT present, but at least you will know ahead of time where they ARE known to be present.
- Fill tanks from municipal water sources whenever possible rather than draft from waterways.
- When possible, avoid drafting from waterbodies with known infestations of aquatic invasive species.
- Avoid transferring water between drainages or between unconnected waters within the same drainage. Do not dump water from one waterbody (e.g., stream, lake, reservoir) into another waterbody. Dispose of excess water over uplands.
- Limit movement of raw water and equipment from downstream to upstream.
- Avoid sucking organic and bottom material into water intakes when drafting from shallow water. Use screens. If collapsible tanks can be filled with municipal water, draft from those tanks instead of untreated water sources.
- Avoid entering (driving through) water bodies or wet areas when possible.
- Remove all plant parts and mud from external surfaces of gear and equipment after an operational period.
- Avoid obtaining water from multiple sources during a single operational period unless drafting/dipping equipment is decontaminated or changed out with clean equipment between sources.
- To prevent leakage and to maintain the prime, be sure that foot valves are screwed snugly onto drafting hoses and are fully closing and not leaking before and during drafting . If foot valves are leaking, refrain from drafting and replace foot valve with one that is operating properly.
- To minimize the potential for engine water leakage through the foot valve, *prime with water from the drafting source rather than using water from the engine tank.* When priming by filling the drafting hose with a bucket, first make sure that the bucket is clean so that it does not transfer AIS. Additionally, don't leave draft hose full with foot valve engaged and submerged in water source when not pumping.

What equipment do I need for inspections and decontaminations?

Inspectors will need to be sure the following equipment and materials are available:

- Hot water pressure washer capable of 140°F and 2,500 psi with water holding tank
- Pumpkin (1,000 gal) to hold water (or chemicals)
- Catchment basin/containment pads for water/chemical effluent collection
- Sump pump for effluent disposal
- Bucket
- Spare foot valve (if possible)
- Infrared thermometer
- FEID Report Forms
- Suspected AIS Collection Forms
- Quat Check 1000 Test paper (See Appendix H for Use Instructions)

Where should Fire Equipment Inspection and Decontamination stations be located?

Ideally, AIS inspections, draining, and decontamination should be located in the same general area. There should be clear control points so that fire equipment can be prevented from commencing raw water drafting operations until they have been through the AIS check station. The location should be far enough from the water that drained holding tank water cannot flow into the water body. Decontaminations should be conducted away from the water and flushed water should be collected in a catch basin if necessary. Collected water can then be pumped to a "high and dry" location for evaporation.

Fire engine exterior

What is the protocol for AIS Fire Equipment Inspections?

Rapid Exterior Inspection

It is important to start and end the inspection at the same place on each piece of fire equipment. Look the fire equipment over for plants, mud, and debris and remove if found. Carefully check the pumping station on the fire equipment, including intakes, upper and lower motor and pump areas. Inspect the drafting foot valves thoroughly for mud, plants, and attached mussels.

Ensure the Fire Equipment is Drained

On smaller pieces of fire equipment (e.g., backpack pumps), ask the firefighter to **remove** the containment plugs as necessary to show the fire equipment is drained. Ensure the firefighter has fully drained the holding tanks and any other containers or compartments that could reasonably hold water. Determine if the fire equipment has been drained sufficiently and presents a relatively low risk of AIS contamination or if decontamination is required.

Foot Valve Testing

The following protocol outlines a simple foot valve test method that can be implemented in the field. At a minimum, the low pressure test should be conducted before beginning drafting operations. When equipment first comes on site or when moving to a new waterbody, the high pressure test should be conducted in addition to the low pressure test.

Equipment List

- Suction hose and ratchet straps
- Assorted male-to-female adapters, increasers, and reducers

If a pressure gauge not present on equipment:

- 1 ½" Pump Test Kit with Gauge – CFE (Cascade Fire Equipment) P/N: 11495 or similar
- 1 ½" 90 Degree Elbow – CFE (Cascade Fire Equipment) P/N: 10251-90 or similar

Low Pressure Test (3-5 psi)

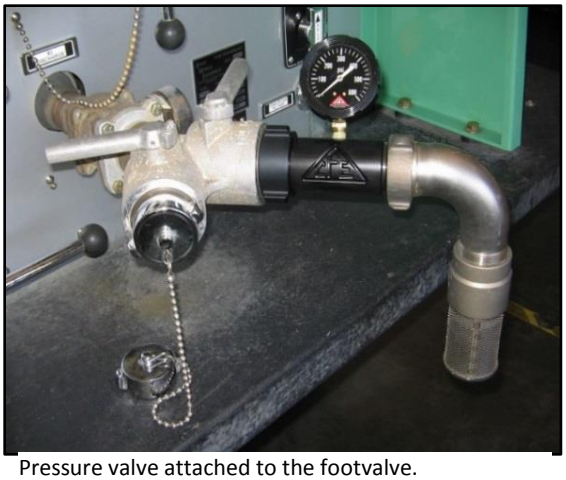
Fasten the suction hose vertically to the engine or water tender. Use ratchet straps or another suitable method, as long as the suction hose is attached safely and securely. To adjust for size of the foot valve (e.g., 1½", 3", or other), use a combination of male-to-female adapters, increasers, and/or reducers to attach the foot valve to the suction hose (Figure 2). Fill the suction hose with six to 10 feet of water to obtain 3-5 psi (2' of hose = 1 psi). The weight of the water provides the pressure on the foot valve. Check the foot valve for 3 to 5 minutes. There should be no leakage. If leakage occurs, replace the foot valve with one that does not leak.

High Pressure Test (130 psi)

To perform the high pressure test, first attach a wye or other suitable shut-off valve to the rear discharge . If a pressure gauge is not available on the equipment, attach a pressure gauge to the wye, then attach the 90 degree elbow and next attach the foot valve. The test set-up should resemble the one shown in Figure 3. Using the engine's pump, increase the pressure to 130 psi. Check the foot valve for 3 to 5 minutes. There should be no leakage. If leakage occurs, replace the foot valve with one that does not leak.

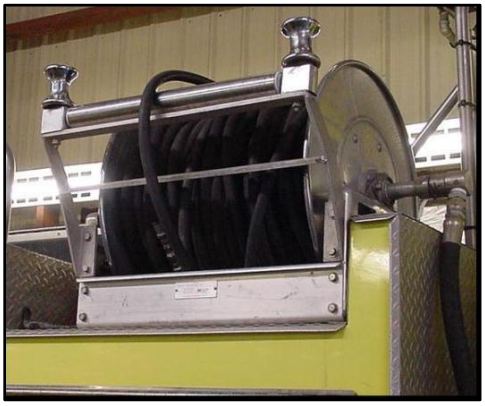
Suction hose with foot valve attached to engine ladder.


Foot valve attached to suction line with various adapters as needed to adjust for foot valve size.


Pressure valve attached to the footvalve.

Complete FEID Report

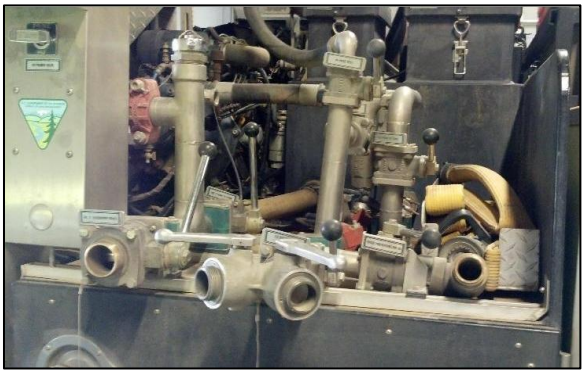
Complete the *FEID Report* (page 9). The white copy stays with the inspector and the yellow copy is provided to the equipment operator. Printed copies can be emailed to ReportAIS@wyo.gov or mailed to: AIS Coordinator, 1212 S. Adams, Laramie, WY 82070. **The FEID Report can also be completed and submitted online at:** https://forms.gle/81iTNEJFsio4fqh79



Engine Hard Line Hose Reel

Drafting from a portable tank (Pumpkin)

Engine plumbing



Engine plumbing

What if a piece of fire equipment contains standing raw water?

You must pay careful attention to all fire equipment that cannot be completely drained and therefore, contain standing raw water. Zebra and quagga mussel larvae (veligers) are microscopic and can be transported in raw water. Mussel larvae are usually much less hardy than shelled adults and die quicker and easier, but they can survive in standing raw water for up to 27 days. It is difficult to pinpoint the exact amount of standing raw water necessary for larvae to survive-more research is needed in this area. Regardless, areas that maintain water or moisture for extended periods of time may not dry sufficiently and could harbor larvae.

Of great concern in the past was the possibility that residual engine or helicopter tank water contaminated with AIS could be transferred to uncontaminated waterbodies during the drafting process. However, if proper drafting and water handling BMPs are used and foot valves are working correctly (see *Appendix H*), there is low risk that contaminated tank water could "seep" into the drafting water source.

Priming the engine pump with source water and not using tank water to initiate the prime eliminates the possibility of residual tank water entering a new waterbody through a leaky footvalve. Offer to help engine operators test their foot valves for leakage. Ask them if they are able to prime their pumps with source, or stream, water rather than from the engine tank. See *Appendix H* for methods to field test foot valves for leakage. Helicopter snorkels do not need to be primed, with either source or tank water, so there is no risk of residual tank water entering a water source during helicopter drafting operations.
Minimal risk occurs when contaminated tank water is applied to fire and upland areas so long as it does not enter other waterbodies. Water delivery equipment and accessories (e.g., fireline hoses, wye valves, nozzles) that do not transfer tank water to waterbodies do not need to be disinfected.

Familiarize yourself with situations where risk of AIS transfer is highest, such as gear that contacts untreated water and later is moved to new watersheds or waterbodies. Or a helicopter bucket that has snagged water plants and mud. Be able to discuss these scenarios so that others understand that the objective is to reduce the possibility of moving AIS from one source to another.

What is the Exit Inspection protocol for fire equipment leaving Wyoming?

As part of the normal demobilization process, incidents/agencies releasing fire equipment/apparatus should ensure it is inspected after contact with waterways. This requires a rapid visual and tactile check for AIS, and it verifies that the firefighter has followed the proper procedures to **drain** all compartments and **clean** off the fire equipment prior to leaving. If equipment has had contact with known AIS infected Wyoming waterways, then fire apparatus/equipment should be decontaminated prior to being released for demobilization.

Crews working on an aerial "Bambi" bucket

Engine discharge valve

Wyoming Fire Equipment Inspection and Decontamination Report

Complete and keep white copy with inspector and yellow copy with mobile equipment

Date: _____ **Location**: _____ **Fire Code:** _____

Equipment Operator:

Equipment Description and ID (license plate, cache #, property tag #, other):

_____

Agency/Department: _____

Home Unit Location: _____

Person responsible: _____

Name Water Body last used for drafting: _____State: _____

Inspection and Decontamination Procedure Performed:

Upon: ☐ initial assignment/arrival ☐ transfer to different water body ☐ demobilization

Inspection Only (no need for decontamination procedures): ☐ sign below

Aquatic invasive species present : Y/N (circle) Species (if known): _____

Standing water present:Y/N (circle)

Decontamination Protocol:

Hot water- Temp:_____ Time:_____Area on equipment decontaminated:_____

Chemical - describe (name/time of treatment): _____

Other Method (scraping, physical removal): _____

Additional Comments: _____

Footvalve Testing:

Low Pressure Test Perfomed ☐ High Pressure Test Performed ☐

Comments:_____

Inspected by (print name):_____ Inspector #____

Title:_____ Phone: _____

Inspector Signature:_____ Date: _____

Equipment Operator: I hereby authorize the state certified AIS inspector to decontaminate the above referenced fire equipment in accordance with state procedures.

_____

Name Date

What is the protocol if mussels or other possible AIS are found on a piece of Fire Equipment?

If you find zebra or quagga mussels or other possible AIS, it is required that you **Report, Document, Collect,** and **Decontaminate**. If necessary, inform the operator that it is a violation of AIS regulation to operate or transport the fire equipment until it has been decontaminated. **Any piece of fire equipment found to contain mussels that are alive or of unknown viability must undergo a full decontamination and quarantine to allow desiccation time to kill any mussels missed during decontamination** (see page 14).

Report

Report your suspected AIS discovery:

- Telephone: 1-307-721-1373 or 1-877-WGFD-AIS

Your initial report can be brief but should include the following information:

- Date/Time
- Location (Current location of fire equipment and last waters used in)
- Suspected species of AIS
- Name of inspector

Document

You must thoroughly document your findings. You will need to complete the *FEID Report* (page 9) as well as the *Suspected AIS Collection Form for Fire Equipment Inspection* (page 11). You will need to take digital pictures of the specimen and the entire piece of fire equipment before, during (if possible), and after decontamination.

- Take digital pictures of the specimen. Take a close-up photo, especially if you can show byssal threads (if specimen is a zebra or quagga mussel). Place a common object such as a pencil or penny next to the specimen and photograph the combination to demonstrate the relative size of the specimen.
- Photograph an overview of the entire piece of fire equipment, and the area(s) of the piece of fire equipment where the specimen was found.

Collect

Place Specimens in Sample Vials—Fill the sample vial with 70% ethanol. This can be purchased directly or can be made up from 100% grain alcohol diluted with *de-ionized* or *distilled* water. Do not use tap water, or "de-chlorinated" tap water because it can completely destroy sample DNA. Place 5-10 specimens in the specimen vial and tightly seal the vial. Write the date/location/contact on the vial with a permanent marker. Place the vial in a Ziploc bag.

FedEx Samples within 48 hours to AIS Program Office for Identification—Place the Ziploc bag(s) containing the sample(s) into a FedEx mailer and ship the package to:
Wyoming Game and Fish Department, AIS Program Coordinator
1212 S. Adams, Laramie, WY 82070
Email ReportAIS@wyo.gov to notify the office that the package is on its way.

Decontaminate

Most sites will have or can provide a hot water high pressure decontamination system (>140°F, minimum 2500 psi) to decontaminate the piece of fire equipment, gear, and other equipment. The *FEID Report* (page 9) must be completed for all fire equipment sent for decontamination. Fill out the report completely and photo document the decontamination of the piece of fire equipment before, during, and after decontamination.

State of Wyoming

AIS COLLECTION FORM

Specimen Collection and Shipping Instructions

1. Collect specimen carefully to obtain entire organism. Use clean, sterile tools to prevent contamination.

2. Place specimen in sample vials.

a. Only fill 50% of vial with ethanol to cover specimen and prevent leakage.

b. Use 70% reagent alcohol or ethanol, or make it up from 100% reagent alcohol diluted with deionized or distilled water. *Trace amounts of chlorine from tap water, or "dechlorinated" tap water can completely destroy sample DNA.*

c. Do **not** use formaldehyde.

4. Write the date and location directly on sample vials with alcohol resistant permanent sharpie marker.

5. Place sample vials in Ziploc bags.

6. Place Ziploc bag and the completed form (complete form with alcohol resistant permanent sharpie marker) below in bubble mailer or padded box.

7. FedEx (ASAP-within 48 hours) to: WGFD, AIS Program Coordinator,
1212 S. Adams, Laramie, WY 82070

8. Email ReportAIS@wyo.gov to notify WGFD that the sample is being shipped

9. If you have questions, call 307-721-1373

10. Remember to disinfect all collection tools by storing them in acidic acid or vinegar solution.

↓ *Remove bottom half of page and include in mailer with vials being shipped to WGFD for analysis.*

SUSPECTED AIS COLLECTION FORM FOR FIRE EQUIPMENT

Collector's Name: _____

Collection Location: _____

Phone: _____ Email: _____

Date of Collection: _____ Time of Collection: _____

Date Mailed: _____

REASON FOR COLLECTION (check all that apply)

- Visual ID of AIS ☐
- Suspected AIS ☐
- Plants ☐
- Unidentifiable Organic Material ☐

↓ *Do Not Write Below Line:* ***For Lab Use Only***

Date Identified: _____ Specimen ID: _____

Lab Personnel:

Coordinator Contacted with Results ☐

What is the Fire Equipment Decontamination Protocol?

To ensure that zebra and quagga mussels and other AIS are removed and destroyed, fire equipment decontamination protocols include:

1—Ensure personal and public safety by wearing personal protective equipment (eye and ear protection, closed toed shoes; refer to chemical label for additional recommendations).

2—The removal of all visible mud, plants, and organisms from the exterior and interior of the fire equipment.

3—Decontaminate the exterior and interior of the fire equipment with hot water or Quat.

4—After decontamination, the fire equipment must be inspected again to ensure a successful decontamination.

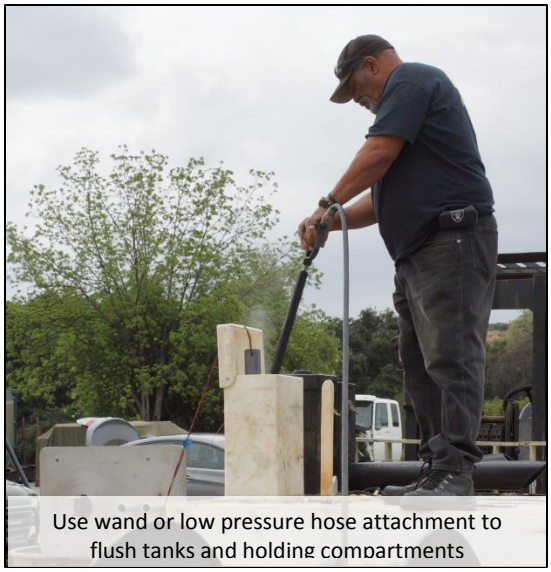
5— Ensure an *FEID Report* is completed and submitted.

What types of decontaminations will I do?

- Standing Raw Water/Holding Tank Flush
- Plant Decontamination
- Full Decontamination for Confirmed or Suspected AIS

Standing Raw Water Decontamination

It is necessary to perform standing raw water decontaminations when a piece of fire equipment has standing raw water from a known mussel infested water. All fire equipment with small amounts of standing raw water need to be drained regardless of where the fire equipment was last used. This decontamination requires the completion of the *FEID Report*. Parts of the fire equipment that may hold raw water include the holding tanks, hoses and internal compartments, drafting foot valves and corresponding intakes.



Use wand or low pressure hose attachment to flush tanks and holding compartments

Standing Raw Water Decontamination Protocol

Hot Water Protocol:

1. Complete FEID Report.
2. Attach a low pressure (garden hose) attachment to decontamination unit or use the spray wand with the high pressure nozzle removed.
3. Start decontamination unit and turn on burner, adjust thermostat to 120°F. Test the temperature of the water using a digital thermometer by spraying water from decontamination unit into a bucket and verifying the temperature with a digital thermometer. Failure to do this can result in damage or ineffective decontamination.
4. Remove any plugs and drain compartment of all water.
5. Replace plug so that compartment will hold water.
6. Start water flowing through unit and flush holding tanks and internal compartments with enough hot water (120°F) to provide adequate coverage on the base and sides. Flush at low pressure for a minimum of 2 minutes.
7. If a tank pump is present, then it must be flushed with hot water (120°F) and run until the tank appears to be empty. If no pump is present, remove plug and drain compartments.
8. After decontamination is complete, stop water flowing through unit, turn off decontamination unit burner and then run water through unit until discharge water is cold (do this away from any equipment in an area with good drainage).

*If a helicopter bucket has a butyl (rubber) valve seal, avoid prolonged application of hot water spray to the seal to prevent softening of this vulnerable material. Power washing greatly reduces the likelihood that any target aquatic invasives are present.

OR

Quat Protocol:

Tank Strainer Screen

1. Complete FEID Report.
2. Dilute Quat cleaning solution Green Solutions High Dilution256 or Super HDQ using instructions in Appendix H.
3. Set up a portable disinfection tank (pumpkin) and fill with diluted Quat.
4. On fire equipment, remove any plugs and drain compartment of all water.
5. Replace plug so that compartment will hold chemical.
6. Rinse holding tanks and internal compartments with enough Quat solution to provide adequate coverage on the base and sides for 10 minutes.
7. If a tank pump is present, run until the tank appears to be empty. If no pump is present, remove plug and drain compartments of Quat chemical.*Discharge the Quat solution back into the disinfection tank for reuse or proper disposal.
   *It is preferred to use low quantities of quat for disinfecting foot valves, however there may be times when higher quantities are required if AIS are found on equipment.

Plant Decontamination

During all inspections, inspectors should remove all plant material. However, when plant material cannot be completely removed, it is necessary to perform a plant decontamination. Aquatic weeds such as Eurasian watermilfoil can establish new populations with only a small fragment of the parent plant; therefore it is imperative they are not transported to new locations. Plant decontaminations are conducted on localized areas of the fire and require the completion of the *FEID Report*.

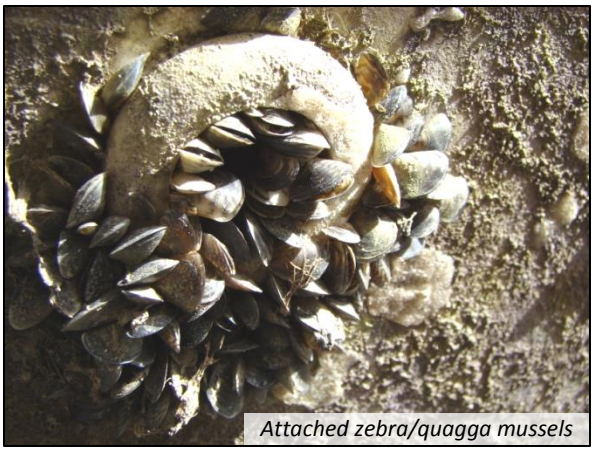
Plant Decontamination Protocol

1. Complete *FEID Report*.
2. Collect plant specimen and Complete the *Suspected AIS Collection Form*.
3. Start decontamination unit and turn on burner, adjust thermostat to 140°F. Test the temperature of the water using a digital thermometer by spraying water from decontamination unit into a bucket and verifying the temperature with a digital thermometer. Failure to do this can result in damage or ineffective decontamination.
4. Spray the areas where plant material is located with hot water (140°F) and high pressure for a minimum of 2 minutes. Sensitive areas such as engine plumbing require flushing with low pressure for 2 minutes.
5. Turn off decontamination unit burner and then run water through unit until discharge water is cold (do this away from any equipment in an area with good drainage).

Full Decontamination for Confirmed or Suspected Mussels

It is necessary to perform a full decontamination of the fire equipment if confirmed or suspected zebra/quagga mussels are identified on any part of the fire equipment.

Any piece of fire equipment found to contain mussels that are alive or of unknown viability must undergo a full decontamination and quarantine to allow desiccation time to kill any mussels missed during decontamination.



Attached zebra/quagga mussels

A full decontamination is time consuming but absolutely necessary in these circumstances. It requires decontamination of all areas of the fire equipment that may have come in contact with raw water including: all interior compartments including gear and equipment, internal tanks and pumps, draft hoses, and the exterior. Full decontamination requires the completion of the *FEID Report* and the *Suspected AIS Collection Form for Fire Equipment* (page 11). Full decontaminations should move from the inside of the fire equipment to the outside.

It is necessary to perform a full decontamination of the equipment when adult or juvenile mussels are identified on any part of the watercraft or if unidentified AIS (such as bumps on the hull) are detected.

Full Decontamination Protocol

1. Complete *FEID Report.*
2. Collect specimens and complete *Suspected AIS Collection Form for Fire Equipment*.
3. Start decontamination unit and turn on burner, adjust thermostat to 120°F. Test the temperature of the water using a digital thermometer by spraying water from decontamination unit into a bucket and verifying the temperature with a digital thermometer. Failure to do this can result in damage or ineffective decontamination.
4. Full decontaminations should move from the inside of the equipment to the outside.
5. **Internal Compartments: The Quat Protocol is preferred over the Hot Water Protocol when decontaminating for confirmed or suspected AIS.**
6. Adjust thermostat on decontamination unit to 140°F. Repeat Step 2 to test temperature output.
7. **Exterior:** Portions of the exterior of the fire equipment and undercarriage which contact raw water must be thoroughly washed with hot water (140°F) at high pressure (2500psi) for a minimum of 10 seconds.
8. Use the high pressure wand and the 40° nozzle to spray the exterior of the fire equipment. Work methodically from the front of the fire equipment to the rear. Keep the wand at a distance of no more than 12" from the equipment to maintain adequate temperature. Spray each area for a minimum of 10 seconds.
9. Sensitive areas on the exterior of the fire equipment (such as the pump control panels and gauges, plumbing, and loose wiring) should be thoroughly flushed (top, bottom and sides) with low pressure and hot water (140°F) for a minimum of 2 minutes. If a helicopter bucket has a butyl (rubber) valve seal, avoid prolonged application of hot water spray to the seal to prevent softening of this vulnerable material. Power washing greatly reduces the likelihood that any target aquatic invasives are present.
10. Turn off decontamination unit burner and then run water through unit until discharge water is cold (do this away from any equipment in an area with good drainage).

Any fire equipment with mussels that are alive or of unknown viability requires decontamination **and** quarantine. Only fire equipment with obviously dead mussels is allowed to proceed **after** decontamination. If in doubt about the viability of mussels found on fire equipment, quarantine is required.

Exterior spray with high pressure wand

Low Pressure Hose Attachment

Exterior spray

What are recommended quarantine times for a mussel encrusted piece of fire equipment?

The 100th Meridian Initiative has developed a **Quarantine Estimator for Zebra-Mussel Contamination** that estimates recommended drying times based on average humidity and temperature zones in the 48 contiguous United States. The quarantine table below should be used to determine the length of quarantine required for any piece of fire equipment found to be encrusted with live mussels. The quarantine table is based on averages; therefore, quarantine may also be increased or decreased if information suggests seasonal changes for a specific area. **To determine if dry times should be increased or decreased email ReportAIS@wyo.gov or call 307-721-1373**.

Maximum Daily Temperature (°F)	Minimum Days out of Water
<30	3
30-40	28 (4 weeks)
40-60	21 (3 weeks)
60-80	14 (2 weeks)
80-100	7 (1 week)
>100	3

What other Aquatic Invasive Species is Wyoming concerned about?

While some of these species have not been documented in Wyoming, the state is concerned about numerous AIS that may pose a significant threat to the aquatic resources or water infrastructure of the state. It is illegal to possess or transport these species in Wyoming. Water users can help prevent the spread of all AIS by making sure their equipment is Drain, Clean, and Dry. Aquatic invasive species of concern in Wyoming include the following:

Mollusks

New Zealand Mudsnail

Photo by Dan Gustafson, Montana State University.

The New Zealand mudsnail is native to mainland New Zealand and adjacent small islands. It was probably introduced into the United States through transoceanic ships or transported with live game fish. The species was first discovered in the Snake River, Idaho in 1987 and has since spread to Oregon, Montana, California, Arizona, Washington, Wyoming, Colorado, and Lake Ontario, Lake Erie, and Lake Superior. The mudsnail is parthenogenic (female clones) and densities have been recorded over 300,000 per square meter. It is transported by fish and birds, natural downstream dispersal, upstream through rheotactic behavior, and by humans on fishing gear. Impacts of introduction include outcompeting native species and altering water chemistry. Currently, populations in Wyoming occur in Yellowstone National Park (Madison, Firehole, Gibbon, Gardner rivers, Nez Perce Creek), Grand Teton National Park (Polecat Creek and the Snake River), Lake Cameahwait (Bass Lake), and in the Bighorn and Shoshone rivers. New populations of mudsnails were documented in the Salt River and North Platte River in 2018.

Asian clam

Photo by Noel Burkhead, USGS

The Asian clam is native to Asia, Africa, the Mediterranean, and Australia and is believed to have been introduced intentionally as food or incidentally imported with the Pacific oyster. It was initially discovered in 1938 in the Columbia River and now occurs in 38 states. Asian clams are spread through bait bucket introductions, accidental introductions with aquaculture species, illegal introductions for food, and through water currents. Much like zebra and quagga mussels, the Asian clam can clog pipes at power generation and water supply facilities, causing millions of dollars in damage. Asian clam have been confirmed in the Laramie River, the North Platte River below Guernsey Reservoir and in Keyhole Reservoir in Wyoming.

Crustaceans

Rusty crayfish

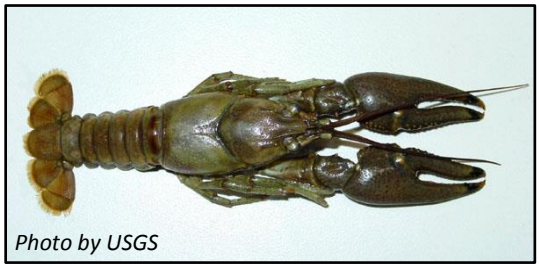


Photo by USGS

Rusty crayfish are native to the Ohio, Tennessee, and Cumberland drainages in eastern United States. The species has been introduced into 14 other states, most likely by baitfish introductions. Rusty crayfish have the potential to outcompete native crayfish and established populations can destroy plant bed abundance and diversity. Rusty crayfish are currently present in Wyoming in a North Platte River tributary drainage where they had been illegally stocked. Attempts to eradicate the species in 2006 and 2007 were proven unsuccessful when the species was found below the original treatment area in 2012. A further control effort was made in 2013 and its success is undetermined. No other populations have been found in Wyoming.

Fishes

Snakehead

Photo by Wikipedia.

Species from the genus *Channa* or *Parachanna* are referred to as snakeheads. Snakeheads are native to southern and eastern Asia and parts of Africa. They have historically been sold in the U.S. as food in Asian markets and also as pets, and were released via these sources. Snakehead have now been introduced into waters in Arkansas, California, Florida, Delaware, Hawaii, Illinois, Maine, Maryland, Massachusettes, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island and Virginia. They are able to adapt to a variety of habitats and can live for long periods of time (up to four days) out of water. Snakehead feed primarily on other fish, but also consume insects, plants, crustaceans, reptiles and even small birds and mammals. There are no known natural predators of snakehead in the U.S. Once this species becomes established it is very difficult to eradicate.

Asian Carp: Bighead, Silver, Black

Photos by USGS, bighead carp (left); Department of Fisheries and Allied Aquacultures, Auburn University, silver carp (center); Rob Cosgriff, Illinois Natural History Survey, black carp (right); USFWS.

Bighead carp are native to China and were intentionally introduced in 1972 in Arkansas in an attempt to improve water quality and increase fish production in culture ponds. The species now occurs in at least 24 states and is naturally reproducing. Bighead carp may deplete zooplankton populations and therefore compete with native fishes. Silver carp are native to Southeast Asia and east Russia and were intentionally introduced into the United States in 1973 for phytoplankton control and as food fish. The species now occurs in at least 18 states and is naturally reproducing. The negative impacts of introduced silver carp are the same as those for bighead carp. Black carp are native to Asia and east Russia and were unintentionally introduced in the early 1970s as a stowaway with intentionally introduced grass carp. The species was then intentionally introduced in the early 1980s as a food fish and for biological control of yellow grub. Black carp now occur in at least 5 states. Black carp may reduce populations of native mussels and snails through predation and negatively affect the aquatic ecosystem.

Brook stickleback

Photo by Konrad P. Schmid, USGS

The brook stickleback is native to central North America. It has been introduced into 16 states outside of its native range primarily as a result of baitfish introductions. Brook stickleback have been found in several drainages throughout Wyoming including the Beaver, Badwater, Big Horn Lake, Cache La Poudre, Laramie, Medicine Bow, North Platte and Shoshone drainages. Brook stickleback have been shown to compete with and negatively affect other fish species and waterfowl. Studies show that waterfowl may be negatively impacted by brook stickleback due to their affect on zooplankton biomass and abundance. Brook stickleback are known to forage for other fishes eggs which may negatively impact fish populations and result in reduced fishing opportunities.

Plants

Hydrilla

Hydrilla is native to Asia and was introduced into the United States in the early 1950's for use in aquariums. The species spread into open water through discarded fragments or by planting in canals. Since its initial introduction, hydrilla has spread to 27 states, most likely transported on trailered watercraft. Hydrilla displaces native vegetation, alters physical and chemical properties in lakes, reduces fish foraging efficiency, obstructs boating, fishing, and swimming, and impedes water delivery.

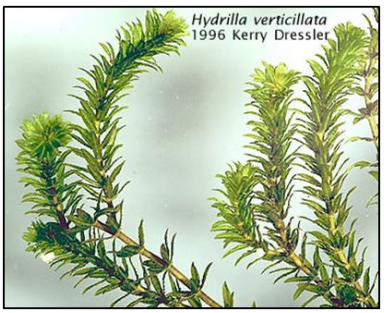


Photo by Kerry Dressler

Eurasian watermilfoil

Photo USGS

Eurasian watermilfoil is native to Europe, Asia, and northern Africa and may have been intentionally introduced into the United States. It was first documented in Washington D.C. in 1942, and now occurs in 45 states and Canada. The species is spread on trailered watercraft and fragments can spread naturally downstream; one stem or leaf fragment can start a new colony. Eurasian watermilfoil is an aggressive plant, displacing native plants leading to reduced diversity. Dense beds form canopies and reduce light penetration, invertebrate abundance, fish forage space, and fish predation efficiency. In addition, it degrades water quality and reduces oxygen levels. Dense beds can also hamper recreation by restricting swimming, fishing, and boating.

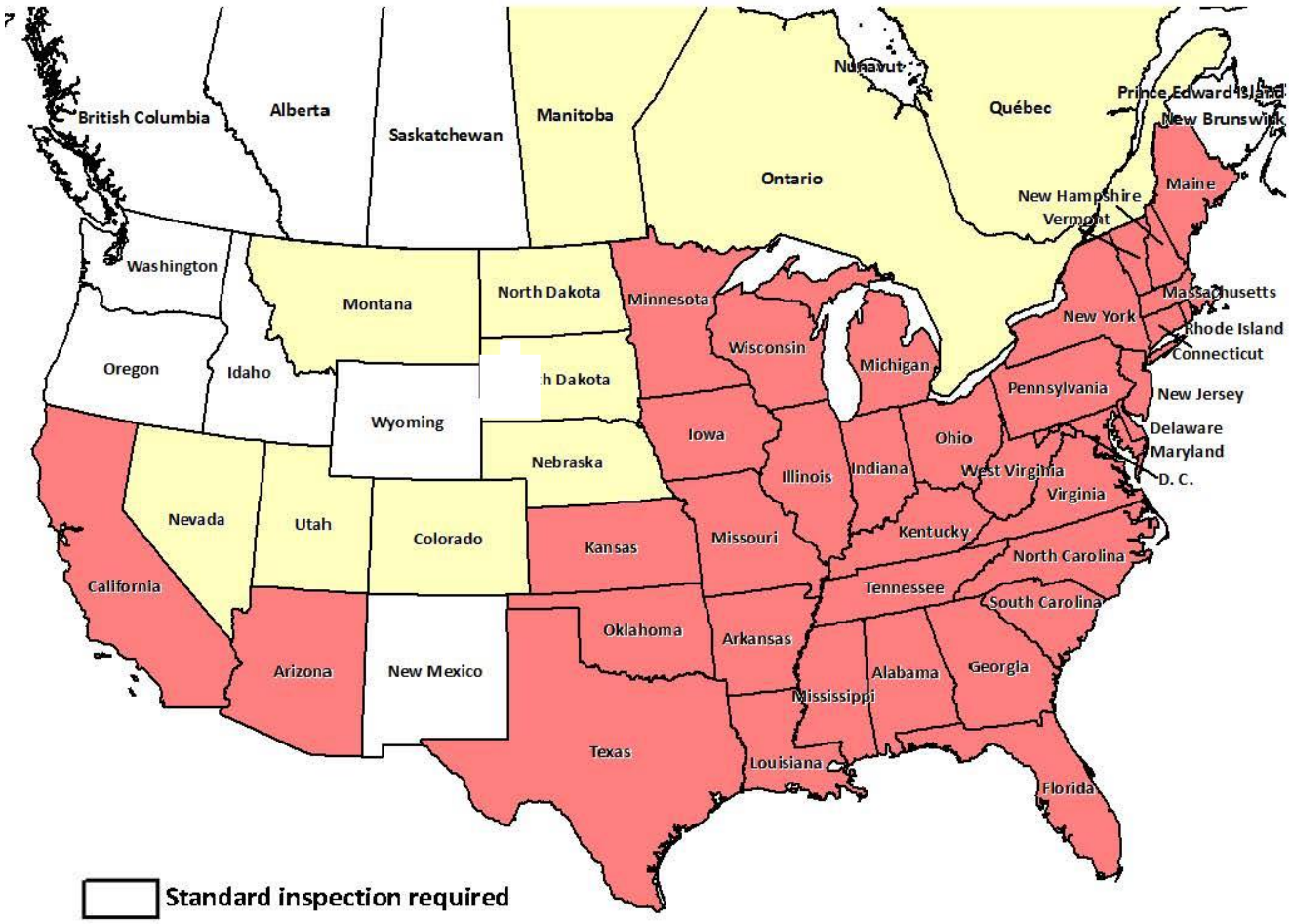
Curly pondweed

Curly pondweed is native to Eurasia, Africa and Australia and was introduced into the United States in the mid 1800's. It is now found in almost every state in the continental U.S. aside from Maine and South Carolina. Curly pondweed reproduces by seed which can be easily transferred in mud or water. It has been introduced into new areas by accidental introductions and as an ornamental plant. Curly pondweed competes with native plants reducing plant diversity and forms dense mats that impact water-based recreation. Curly Pondweed was first found in Wyoming in 2011 in Lake DeSmet. It is currently present in Boysen Reservoir, Deaver Reservoir, East Newton Lake, West Newton Lake, Shoshone River, Lake DeSmet, Keyhole Reservoir, North Platte River, and Pathfinder Reservoir.

Photo by Vic Ramey, University of Florida

Appendix A: Map of high risk states and high risk waters as of January 2019.

Map of high risk states and suspect, positive, or infested waters



COLORADO
- Green Mountain Reservoir

MONTANA
- Tiber Reservoir (Lake Elwell)
- Canyon Ferry Reservoir

NEBRASKA
- Carter Lake (border w/Iowa)
- Cunningham Lake
- Lake Yankton (Cottonwood Lake)
- Lewis and Clark Lake
- Missouri River
- Offutt Base Lake
- Zorinsky Reservoir

NEVADA
- Colorado River
- Lake Mead (Hoover Dam)
- Lake Mohave (Davis Dam; AZ/NV)

NORTH DAKOTA
- Red River

SOUTH DAKOTA
- Lake Yankton (Cottonwood Lake)
- Lewis and Clark Lake (Gavins Point Dam)
- McCook Lake
- Missouri River

UTAH
- Lake Powell, UT/AZ (Glen Canyon Dam/Rec Area)

CANADA
- Lake Winnipeg (Manitoba)
- Lake Superior (Ontario)
- Lake Ontario (Ontario)
- Lake Erie (Ontario)
- St. Lawrence River (Quebec/Ontario)

Appendix B: Description of Little Queens Incident involving the potential accidental mixing of ammonia and chlorine based products.

Little Queens Incident

8-27-13

Quaternary Ammonia incident and potential hazard

Subject: Potential accidental mixing of hazardous chemicals.

Background: Quaternary Ammonia, also known as "Quat" or " Quat 128", is an ammonia based product that is used as a disinfectant to rid vessels of water carrying diseases that may contaminate other water sources with diseases hazardous to aquatic life. Mixing with chlorine based materials with Quat may result in the creation of toxic gases that could become life threatening.

Incident with serious potential: Quat and a chlorine based product were procured and provided to the Little Queens incident. The items were delivered in the same box and nearly mixed together while setting up a Quat station for treatment of incident equipment. The near miss was caught by incident personnel before mixing occurred avoiding a potentially serious accident.

Concerns to Incident Personnel:

- Mixing bleach with ammonia is potentially hazardous or fatal as it can create toxic vapors.
- Hydrochloric acid is formed and then the ammonia and chlorine gas react to form chloramine, which is released as a vapor. If ammonia is present in excess (which it may or may not be, depending on the mixture) toxic and potentially explosive liquid hydrazine may be formed.

Mitigation Measures:

What to Do If You Mix Bleach and Ammonia - First Aid

If exposed to fumes from mixing bleach and ammonia, immediately remove yourself from the vicinity to fresh air and seek emergency medical attention. The vapors can attack your eyes and mucous membranes, but the biggest threat comes from inhaling the gases.

1. Get away from the site where the chemicals were mixed. You can't call for help if you are overwhelmed by the fumes.
2. Call Incident Communications or 911 for emergency help. For minor incidents, call Poison Control for advice on handling the after-effects of exposure and cleaning up the chemicals. Poison Control can be reached at: 1-800-222-1222.
3. If you find someone who you think has mixed bleach and ammonia, chances are he or she will be unconscious. If you can, remove the person to fresh air, preferably outdoors. Call Incident Communications or 911 for emergency assistance. Do not hang up until instructed to do so.
4. Thoroughly ventilate the area before returning to dispose of the liquid. Seek specific instructions from Poison Control so that you don't hurt yourself. You're most likely to make this mistake in a closed room, so leave and seek assistance, return later to open a window, allow time for the fumes to dissipate, and then go back to clean up. Dilute the chemical mixture with plenty of water. Wear gloves, just as you would for either bleach or ammonia.

Appendix C: Glossary of Terms

Clean – absent of visible AIS or attached vegetation, dirt, debris or surface deposits including mussel shells or residue on the fire equipment, pumps, hoses, or tanks that could mask the presence of attached mussels.

Drafting – refers to the use of suction to move a liquid such as water from a vessel or body of water below the intake of a suction pump.

Drain – to the extent practical, all water drained from any live-well, storage compartment, bilge area, engine compartment, deck, ballast tank, water storage and delivery systems, cooler or other water storage area on the fire equipment, pumps, hoses, or tanks.

Dry – no visible sign of standing water, or in the case of equipment, wetness on or in the fire equipment, pumps, hoses, or tanks.

Helicopter bucket or "Bambi" bucket – a specialized bucket suspended on a cable carried by a helicopter to deliver water for aerial firefighting. Each bucket has a release valve on the bottom which is controlled by the helicopter crew.

High risk water – a water classified as positive or suspect for zebra or quagga mussels.

Hose reel – a cylindrical spindle made of either metal, fiberglass, or plastic and is used for storing a hose.

Infested water body - a water body that has an established (recruiting or reproducing) population of mussels.

Operator – the person who has command and control of the piece of fire equipment.

Portable tank – a collapsible temporary tank designed for the reserve storage of water in firefighting.

Positive water body - water with a confirmed positive testing result of veliger mussels in two or more consecutive sampling events.

Quarantine – to prohibit equipment from contacting raw water until the completion of required AIS desiccation period, not to exceed thirty days.

Raw water – untreated water having the potential to harbor aquatic invasive species; does not include ground or municipal treated water.

Strainer – a type of perforated metal sieve used to strain or filter out solid debris in the water system.

Suction hose – a specific type of fire hose used in drafting operations, when a fire engine uses a vacuum to draw water from a portable water tank, pool, or other static water source.

Suspect water body – water with a confirmed positive testing result of veliger mussels in a single sampling event.

Undetected/Negative water - sampling/testing is ongoing and nothing has been detected, or nothing has been detected within the time frames for de-listing.

Valve – devices that make it possible to monitor and control the flow of a substance from a source and through some type of circulation system.

Appendix D. Photographs and description of various fire equipment.

Water delivery/holding equipment

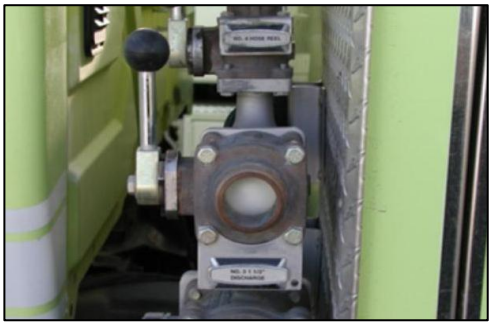
Sky Crane with dipping snorkel

BLM fire engine

Aerial “Bambi” bucket

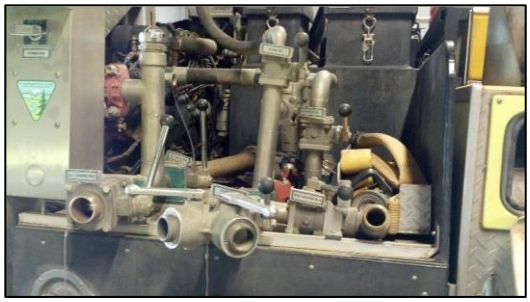
Portable tank (pumpkin)

Engine hard line hose reel



Engine discharge valve

Engine plumbing



Engine holding tanks

Valves

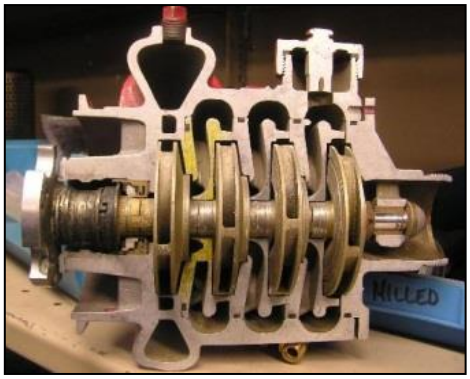


Foot valve strainers

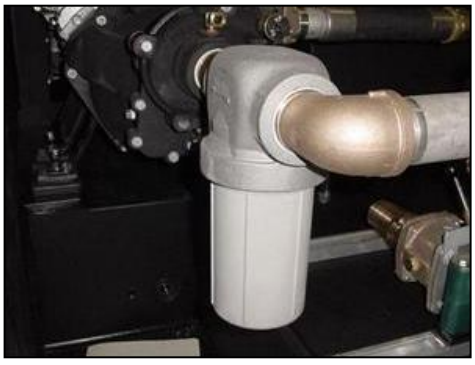


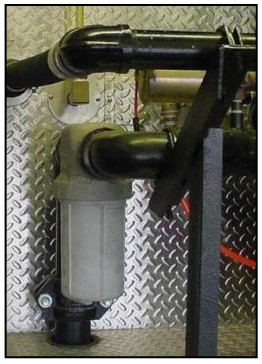
Drafting suction hoses


Pump (cross-section)



In-line strainers





Appendix E: List of Wyoming AIS contacts.

Fire Agency Contacts

- Bureau of Land Management, Assistant State Fire Management Officer: Paul Hohn, 307 775-6086
- Wyoming State Forestry, Assistant Fire Management Officer: Chris Fallbeck, 307 777-631-2594
- United States Forest Service (Region 2), Regional Fire Operations Specialist: Scott Sugg, 303 445-4369

General AIS Questions, Sample Submissions, Quarantine Information

- Wyoming Game and Fish Department, AIS Coordinator: Beth Bear, 307-721-1373 or 307-399-6553
- AIS Hotline (for general information): 1-877-WGFD-AIS (877-943-3247)
- AIS Website: wgfd.wyo.gov/AIS

Appendix F: Fire equipment Inspection and Decontamination Certification Guidelines

Course Outline

The fire equipment inspection and decontamination course is designed to train individuals in how to inspect and decontaminate fire apparatus and equipment that may be transporting AIS. The training also includes information on basic biology, impacts, transport vectors and distribution of AIS. A Fire Equipment AIS Task Force consisting of WGFD, BLM, USFS, and Wyoming State Forestry has created and maintains a training manual, *Wyoming Aquatic Invasive Species Fire Equipment Inspection and Decontamination Manual*, that is used as the primary educational tool and standard for inspectors. The training and manual are based on the protocols and standards developed for watercraft inspection, as well as the Intermountain Region USFS Aquatic Invasives Species Fire Operations Guidance.

Certification will be awarded to participants who successfully complete an online training course and exam. Individuals who successfully pass the training course are considered an Authorized Inspector for Fire Equipment by the WGFD, BLM, USFS, and Wyoming State Forestry. The WGFD, BLM, USFS, and Wyoming State Forestry may recognize authorized inspectors certified in states outside Wyoming provided their certification meets requirements established by the WGFD.

Certification Requirements

- Complete the required on-line instruction.
- All participants must pass an exam with a score of 80% or higher. If less than 80% on the first exam, participants can re-take the exam within one month. After one month or after two failed attempts, participants will be required to retake the training course.
- The certification is valid for one year from the date of issue. Each participant will receive certification ID card stating the date of issue.
- Certifications can be renewed annually by taking the online re-certification exam.
- Authorized Inspectors may be subject to anonymous quality control checks.
- The WGFD reserves the right to revoke an individual's certification if it is determined the individual is <u>not</u> conducting inspections or decontaminations in accordance with the procedures outlined in the *Wyoming Aquatic Invasive Species Fire Equipment Inspection and Decontamination Manual*. In instances where the certification is removed as a result of deliberate misconduct, re-certification will not be allowed for up to five years. In all other cases, individuals will have the opportunity to attend a training course the following year.

Inspection Locations

Agencies responsible for wildland fire protection and response will maintain inspection locations at duty locations were fire apparatus/equipment are routinely received and in-briefed. The agency(s) responsible for large incidents will ensure the management of such incidents includes AIS inspections on-site or within close proximity. An inspection is valid only when performed by an authorized inspector.

Authorized Inspector

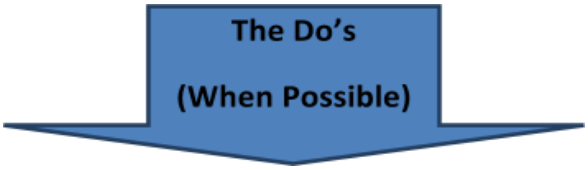
For fire apparatus and equipment, an authorized inspector means an authorized aquatic invasive species inspector who has a valid certification in fire apparatus/equipment from an aquatic invasive species training course that meets the requirements established by the Wyoming Game and Fish Department to certify inspectors for aquatic invasive species inspections and decontaminations.

Liability

Private individuals would be covered under their own liability insurance.

Appendix G: Do's and Don'ts for Firefighters to prevent the spread of AIS

Aquatic Invasive Species (AIS) are any aquatic organism that is not native to an ecosystem and whose introduction does or is likely to cause economic, human health, or environmental harm. **Wyoming State Law 23-4-201 to 206** requires the inspection of water hauling equipment by an authorized inspector. Coordinate with hosting agencies and/or IMTs in Wyoming on how to become certified as an authorized inspector. Wyoming Game and Fish, Wyoming State Forestry Division, Region 2 U.S. Forest Service and the Wyoming BLM encourage our firefighters who work in or near aquatic systems to follow some basic DO'S and DONT's. It takes only one transfer to infest a new area.



- Fill tanks from municipal water sources whenever possible rather than draft from waterways.
- Limit movement of raw water and equipment from downstream to upstream.
- Remove all plant parts and mud from external surfaces of gear and equipment after an operational period.
- To prevent leakage and to maintain the prime, be sure that foot valves are screwed snugly onto drafting hoses and are fully closing and not leaking before and during drafting . If foot valves are leaking, refrain from drafting and replace foot valve with one that is operating properly.
- To minimize the potential for engine water leakage through the foot valve, *prime with water from the drafting source rather than using water from the engine tank.* When priming by filling the drafting hose with a bucket, first make sure that the bucket is clean so that it does not transfer AIS. Additionally, don't leave draft hose full with foot valve engaged and submerged in water source when not pumping.

- Avoid drafting from waterbodies with known infestations of aquatic invasive species.
- Avoid transferring water between drainages or between unconnected waters within the same drainage. Do not dump water from one waterbody (e.g., stream, lake, reservoir) into another waterbody. Dispose of excess water over uplands.
- Avoid sucking organic and bottom material into water intakes when drafting from shallow water. Use screens. If collapsible tanks can be filled with municipal water, draft from those tanks instead of untreated water sources.
- Avoid entering (driving through) water bodies or wet areas when possible.
- Avoid obtaining water from multiple sources during a single operational period unless drafting/dipping equipment is decontaminated or changed out with clean equipment between sources.

Refer to the local AIS map to identify infected areas:
https://www.frames.gov/partner-sites/fire-operations-maps/wyoming/

The danger and urgency involved with fighting wildland fires is understood. It is also understood that cleaning wildland fire equipment can be difficult, but a *little* extra care will go a long way in the effort to protect Wyoming's waterways.

Appendix H: AIS operational guidelines for fire activities

Wyoming State Law 23-4-201 to 206 requires an aquatic invasive species (AIS) inspection of all watercraft and conveyances (i.e. water hauling equipment) entering Wyoming by land. This statute is aimed at trying to limit the spread of harmful AIS into and within Wyoming. Coordinate with your hosting Wyoming Unit and/or Incident Management Team on inspection and certification procedures.

Firefighter and public safety, and risk to property will remain the highest priority in any fire activities. AIS, including plants and animals, pose a risk to both the environment and to firefighting equipment (some species can clog valves and pumps if equipment is not completely drained or treated). Through practical and simple techniques, the spread of these organisms through firefighting can be minimized and help to ensure that firefighting equipment remains operational.

Development of these guidelines was a cooperative effort by the Bureau of Land Management, U.S. Forest Service, Wyoming State Forestry Division, and the Wyoming Game and Fish Department. Guidelines in this manual are based on the National Wildfire Coordination Group "Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations".

Preventing the spread of AIS to and within Wyoming through best management practices and decontamination of equipment is simple and effective.

THE FOLLOWING BEST MANAGEMENT PRACTICES SHOULD BE USED *WHENEVER POSSIBLE:*

- Refer to the Wyoming Dispatch Zone maps with distributions of AIS in Wyoming available at: https://www.frames.gov/partner-sites/fire-operations-maps/wyoming/. You can never be certain that invasives are NOT present, but at least you will know ahead of time where they ARE known to be present.
- Fill tanks from municipal water sources whenever possible rather than draft from waterways.
- When possible, avoid drafting from waterbodies with known infestations of aquatic invasive species.
- Avoid transferring water between drainages or between unconnected waters within the same drainage. Do not dump water from one waterbody (e.g., stream, lake, reservoir) into another waterbody. Dispose of excess water over uplands.
- Limit movement of raw water and equipment from downstream to upstream.
- Avoid sucking organic and bottom material into water intakes when drafting from shallow water. Use screens. If collapsible tanks can be filled with municipal water, draft from those tanks instead of untreated water sources.
- Avoid entering (driving through) water bodies or wet areas when possible.
- Remove all plant parts and mud from external surfaces of gear and equipment after an operational period.
- Avoid obtaining water from multiple sources during a single operational period unless drafting/dipping equipment is decontaminated or changed out with clean equipment between sources.
- To prevent leakage and to maintain the prime, be sure that foot valves are screwed snugly onto drafting hoses and are fully closing and not leaking before and during drafting . If foot valves are leaking, refrain from drafting and replace foot valve with one that is operating properly.
- To minimize the potential for engine water leakage through the foot valve, *prime with water from the drafting source rather than using water from the engine tank.* When priming by filling the drafting hose with a bucket, first make sure that the bucket is clean so that it does not transfer AIS. Additionally, don't leave draft hose full with foot valve engaged and submerged in water source when not pumping.

INSPECTION REQUIREMENTS

If your fire equipment has drafted from or contains standing water in hoses, helicopter buckets, tanks, pumps from high risk water (a water known or suspected to be positive for zebra or quagga mussels) within the last 30 days; OR if you are transporting fire equipment into Wyoming from out of state from March 1 through November 30, you are required to have your fire equipment inspected and possibly decontaminated by an authorized inspector prior to drafting or drawing from or utilizing waterways in Wyoming. During emergency Initial Attack responses to emerging or ongoing wildfires, inspections will be conducted as soon as reasonably possible.

DECONTAMINATING EQUIPMENT

Any equipment that comes into contact with raw water should be decontaminated, which means destroying any unwanted organisms. Decontamination may be accomplished using several methods including hot water or chemical disinfectants. While drying can be a means of decontaminating equipment, some invasives require a minimum of 5 days to be effectively desiccated which may not be practical in wildfire situations. Surfaces to be decontaminated include tanks, portable pumps, hoses, and helicopter buckets-anything that has come into contact with raw water. Decontamination stations should be located where there is no potential for runoff into waterways, storm drains, or sensitive habitats.

Using chemical disinfectants is a reliable method to kill and eliminate most aquatic invasive species. Quaternary ammonium compounds are safe for MOST gear and equipment when used at recommended concentrations and rinsed. *Chlorine products are not emphasized for use* in these guidelines because of their corrosiveness to fabrics, plastics, rubber, and metal. Quaternary ammonium compounds did not meet corrosion requirements for aluminum and **should not be used in aircraft** (e.g fixed-tank helicopters or air tankers). However, they are safe for ground-based tanker equipment.

CHEMICAL TESTING, DILUTION, STORAGE, AND PURCHASE INFORMATION

Testing Chemical Concentrations

When a large volume of chemical solution has been used repeatedly and possibly diluted with excess water or mud, the solution can lose its effectiveness. To determine if the solution is at the correct strength, use "Quat Check 1000" Test Papers, which function like Litmus paper. **The cleaning solution needs to be diluted before it can be tested with these papers.** To do this:

- Add ¼ cup (2 oz) of the Quat solution to a gallon of water. Mix.
- Test the diluted solution with "Quat Chek 1000" Test Paper.
- Match the color of the paper with the ppm's on the color chart. For optimal disinfection, the diluted solution should have a concentration between 400-600 ppm.

The quaternary ammonium formulations *Super HDQ*® and *Green Solutions High Dilution256*® (which replaces the discontinued *Sparquat* 256®) were recently found to be most effective against a variety of AIS. *Green Solutions Neutral Disinfectant®* is a less concentrated version of *Green Solutions 256®*. These formulations can be used at concentrations according to their labels (see below). Soak gear in a bucket for 10 minutes. Alternatively, gear may be disinfected by spraying with quat from a backpack weed sprayer or spray bottle. Afterwards, **rinse gear thoroughly in clean water**. Quat compounds are highly toxic to aquatic organisms but are immobile in soil. Keep effluent containing this product at least 100 feet from lakes, ponds, streams or other waters. Do NOT allow product to enter storm drains, lakes, streams, or other waterbodies

Volume of tap water	***Super HDQ®***	***Green Solutions Neutral Disinfectant High Dilution 256®***	***Green Solutions Neutral Disinfectant®*** (this product is a lower concentration)	**Soak Time**	**Spray Time**
1 gallon water	½ oz	½ oz	2 oz	10 min	5 sec spray; let stand 10 minutes; rinse
1 gallon water	1 Tbsp.	1 Tbsp.	4 Tbsp.	10 min	5 sec spray; let stand 10 minutes; rinse

Storage

Quat can be stored for at least 2 years in unopened containers without losing its effectiveness. Solution should be stored in a cool, dry place, out of direct sunlight. Temperatures can range from 32 to 110 F. Once the Quat solution is made up, it can be used repeatedly for up to a week unless heavily muddied or diluted. Solutions kept in sealed containers, free of contamination by foreign materials, remain more stable and can be effectively used for longer timeframes.

These recommended chemicals are available through GSA (https://www.gsaadvantage.gov) or through local janitorial chemical suppliers.

1) Green Solutions Neutral Disinfectant®
GSA (NSN# 3502-04)
Spartan Chemical Company; EPA registration #1839-169-5741

2) Green Solutions High Dilution 256® (replaced *Sparquat 256®*)
This formulation is **4X more concentrated** than *Green Solutions Neutral Disinfectant®* (see above)

Not carried by GSA, but can be purchased from local janitorial supply businesses. Distributor locations can be found at:
http://www.spartanchemical.com/where-to-buy
(Spartan Chemical Company; EPA registration #1839-169-5741

3) Super HDQ® (twice as concentrated as *Sanicare Quat 128®*)
GSA (NSN# 1204-04)
Spartan Chemical Company; EPA registration #10324-141-5741

Hydrion (QT-10) Quat Dispenser 0-400PPMMicroessential Labs
https://www.microessentiallab.com/ProductInfo/W20-QUATT-QUAT10-SRD.aspx

Grainger, Inc.
http://www.grainger.com/Grainger/items/3UDF5?Pid=search)

Chemical disposal and safety

Caution: Mixing Chlorine based products (such as bleach) with ammonia based products (such as "Quat") is potentially hazardous or fatal as it can produce toxic vapors.

Do not dump treated water into any stream or lake, or on areas where it can migrate into any water body, storm drain, or sensitive habitat. Do not dispose of large quantities of diluted Quat chemicals in municipal sewer systems without consulting the facility.

Use caution when disposing the used cleaning solution and follow all federal, state, and local regulations. **Agencies disposing of used Quat on roadways must complete a Wyoming Department of Environmental Quality application and receive approval prior to disposal.** Quat chemicals are quickly bound to soil and are immobilized, but if soil with bound Quat enters water, some of the Quat can be released and become toxic.

Use protective, unlined rubber gloves and splash goggles or face shield when handling the cleaning solution and take extra precautions when handling undiluted chemicals. Have eye wash and clean water available on-site to treat accidental exposure.

Consult the product label and Material Safety Data Sheet (MSDS) for additional information.

WATER HANDLING EQUIPMENT (engines, tenders, UTVs/ATVs with tanks, etc.)

Inspection

- Look and feel the exterior of the equipment to ensure no plants or organisms are attached. If any suspect organisms are found and cannot be removed, the exterior should be decontaminated.
- Inspect any interior equipment used in water for mud or plants and remove all mud, plants and debris.
- Ensure equipment is drained thoroughly. If water cannot be completely drained, the water holding compartment should be decontaminated.

Decontamination with hot water

- The entire exterior of the water handling equipment must be thoroughly washed with hot water (140°F) at high pressure (2500psi) for a minimum of 10 seconds. Use low pressure on sensitive areas and any areas with loose wiring.
- Remove any plugs and drain compartments of all water. Replace plug so that compartment will hold water. Start water flowing through unit and flush holding tanks and internal compartments with enough hot water (120°F) to provide adequate coverage on the base and sides. Flush at low pressure for a minimum of 2 minutes.
- If plant material cannot be removed from the exterior, spray the areas where plant material is located with hot water (140°F) and high pressure for a minimum of 2 minutes. Sensitive areas such as engine plumbing require flushing with low pressure for 2 minutes.

Decontamination with chemical

Set up a portable disinfection tank (pumpkin) using the quat cleaning solution *Green Solutions High Dilution256*® at 1.8% concentration. See Table 1 for dilution information.

Empty the tank, and then circulate the 1.8% *Green Solutions High Dilution256*® cleaning solution for 10 minutes. Float portable pumps in the disinfection tank and pump cleaning solution through for 10 minutes, then rinse with water. Pump cleaning solution through hoses, and then rinse with water. Discharge cleaning solution back into the disinfection tank for reuse.

PORTABLE EQUIPMENT (pumpkins, fold-a-tanks, portable pumps, hose, backpack pumps, etc.)

Inspection

- Look and feel the exterior of the equipment to ensure no plants or organisms are attached. If any suspect organisms are found and cannot be removed, the exterior should be decontaminated.
- Inspect interior for mud or plants and remove all mud, plants and debris.
- Ensure equipment is drained thoroughly. If water cannot be completely drained, the water holding compartment should be decontaminated.

Decontamination with hot water

- The entire exterior of the portable equipment must be thoroughly washed with hot water (140°F) at high pressure (2500psi) for a minimum of 10 seconds.
- The interior should be drained and then decontaminated with hot water (120°F) and low pressure for a minimum of 2 minutes. Temperatures higher than 120°F may damage equipment.
- Fill compartments with enough hot water to provide adequate coverage on the base and sides and flush for 2 minutes. To the extent possible drain all decontamination water from the compartments.
- If plant material cannot be removed from the exterior, flush with hot water (140°F) and high or low pressure for a minimum of 2 minutes on the areas where plant material is located.

Decontamination with chemical

Set up a portable disinfection tank (pumpkin) using the quat cleaning solution *Green Solutions High Dilution256*® at 1.8% concentration. See Table 1 for dilution information.

Empty the tank, then rinse equipment with the 1.8% *Green Solutions High Dilution256*® cleaning solution for 10 minutes. Discharge cleaning solution back into the disinfection tank for reuse.

AVIATION EQUIPMENT (buckets, snorkels, internal/external tanks, etc.)

*Many national aviation contracts require AIS cleaning and decon procedures.

Inspection

- Look and feel the exterior of the equipment to ensure no plants or organisms are attached. If any suspect organisms are found and cannot be removed, the exterior should be decontaminated.
- Inspect any interior equipment used in water for mud or plants and remove all mud, plants and debris.
- Ensure equipment is drained thoroughly. If water cannot be completely drained, the water holding compartment should be decontaminated.
- Alternate used (possibly contaminated) helicopter buckets with spare (clean) helicopter buckets when possible.
- Do not exceed the manufacturer's recommendation for temperature thresholds.

Decontamination with hot water

- The entire exterior of the water handling equipment must be thoroughly washed with hot water (140°F) at high pressure (2500psi) for a minimum of 10 seconds. Use low pressure on sensitive areas and any areas with loose wiring.
- Internal tanks should be drained and then decontaminated with hot water (120°F) and low pressure for a minimum of 2 minutes. Temperatures higher than 120°F may damage some aviation equipment.
- For internal compartments/tanks use the spray wand with the high pressure nozzle removed or attach a low pressure attachment. Fill compartments with enough hot water to provide adequate coverage on the

base and sides and flush for 2 minutes. To the extent possible drain all decontamination water from the compartments.

- If plant material cannot be removed from the exterior, flush with hot water (140°F) and high or low pressure for a minimum of 2 minutes on the areas where plant material is located.
- If a helicopter bucket has a butyl (rubber) valve seal, avoid prolonged application of hot water spray to the seal to prevent softening of this vulnerable material. Power washing greatly reduces the likelihood that any target aquatic invasives are present.

Decontamination with chemical

DO NOT USE. Use of corrosive chemical disinfectants is not recommended in aircraft or any associated aircraft equipment.

FOOT VALVE TESTING

The following protocol outlines a simple foot valve test method that can be implemented in the field. At a minimum, the low pressure test should be conducted before beginning drafting operations. When equipment first comes on site or when moving to a new waterbody, the high pressure test should be conducted in addition to the low pressure test.

Equipment List

- Suction hose and ratchet straps
- Assorted male-to-female adapters, increasers, and reducers

If a pressure gauge not present on equipment:

- 1 ½" Pump Test Kit with Gauge – CFE (Cascade Fire Equipment) P/N: 11495 or similar
- 1 ½" 90 Degree Elbow – CFE (Cascade Fire Equipment) P/N: 10251-90 or similar

Low Pressure Test (3-5 psi)

Fasten the suction hose vertically to the engine or water tender. Use ratchet straps or another suitable method, as long as the suction hose is attached safely and securely. To adjust for size of the foot valve (e.g., 1½", 3", or other), use a combination of male-to-female adapters, increasers, and/or reducers to attach the foot valve to the suction hose (Figure 2). Fill the suction hose with six to 10 feet of water to obtain 3-5 psi (2' of hose = 1 psi). The weight of the water provides the pressure on the foot valve. Check the foot valve for 3 to 5 minutes. There should be no leakage. If leakage occurs, replace the foot valve with one that does not leak.

High Pressure Test (130 psi)

To perform the high pressure test, first attach a wye or other suitable shut-off valve to the rear discharge . If a pressure gauge is not available on the equipment, attach a pressure gauge to the wye, then attach the 90 degree elbow and next attach the foot valve. The test set-up should resemble the one shown in Figure 3. Using the engine's pump, increase the pressure to 130 psi. Check the foot valve for 3 to 5 minutes. There should be no leakage. If leakage occurs, replace the foot valve with one that does not leak.

Suction hose with foot valve attached to engine ladder.

Pressure valve attached to the footvalve.

Foot valve attached to suction line with various adapters as needed to adjust for foot valve size.

Appendix I: Wyoming State Statute on AIS; Title 23, Chapter 4, Section 201-206.

23-4-201. Definitions.

(a) As used in this article:

(i) "Aquatic invasive species" means exotic or non-native aquatic organisms that have been determined by the commission to pose a significant threat to the aquatic resources, water supplies or water infrastructure of the state;

(ii) "Conveyance" means a motor vehicle, boat, watercraft, raft, vessel, trailer or any associated equipment or containers, including but not limited to live wells, ballast tanks, bilge areas and water hauling equipment that may contain or carry an aquatic invasive species;

(iii) "Decontaminate" means to wash, drain, dry or chemically, thermally or otherwise treat a conveyance in accordance with rules promulgated by the commission in order to remove or destroy an aquatic invasive species;

(iv) "Equipment" means an article, tool, implement or device capable of containing or transporting water or aquatic invasive species;

(v) "Inspect" means to examine a conveyance pursuant to procedures established by the commission in order to determine whether an aquatic invasive species is present, and includes examining, draining or treating water in the conveyance;

(vi) "Water sport toy" means a sailboard, float tube, kite board or any aid to swimming or fishing that is not designed primarily for navigation.

23-4-202. Prohibition on aquatic invasive species; mandatory conveyance checks; reporting.

(a) No person shall:

(i) Launch any conveyance into the waters of this state without first complying with aquatic invasive species prevention requirements established by commission rule;

(ii) Possess, import, export, ship, transport or cause to be possessed, imported, exported, shipped or transported an aquatic invasive species in this state, except as authorized by the commission;

(iii) Introduce an aquatic invasive species into any waters of the state; or

(iv) Refuse to comply with the inspection requirements or any order issued under this article.

(b) A person who knows that an unreported aquatic invasive species is present at a specific location in this state shall immediately report that knowledge and all pertinent information to the commission or a peace officer.

23-4-203. Enforcement.

(a) In order to prevent, control, contain, monitor and whenever possible eradicate aquatic invasive species from the waters of this state, the commission and the department of state parks and cultural resources shall promulgate rules and regulations to administer and enforce the provisions of this article and to establish, operate and maintain aquatic invasive species check stations in order to inspect conveyances.

(b) Every conveyance shall stop at authorized mandatory aquatic invasive species check stations in accordance with rules established by the commission and the department of state parks and cultural resources. Upon probable cause that an aquatic invasive species may be present, a peace officer may:

(i) Require the owner of a conveyance to decontaminate the conveyance; or

(ii) Decontaminate or impound and quarantine the conveyance as provided in this section.

(c) The commission, in consultation with the department of state parks and cultural resources, may restrict watercraft usage on waters of the state as provided in W.S. 41-13-211(b) upon a finding that a specific

body of water is threatened with the imminent introduction of an aquatic invasive species or an aquatic invasive species has been introduced to the specific body of water.

(d) Any peace officer is authorized to stop and inspect for the presence of aquatic invasive species or for proof of required inspection any conveyance:

(i) Immediately prior to a boat, vessel or watercraft being launched into waters of the state;

(ii) Prior to departing from the waters of this state or a boat, vessel or watercraft staging area;

(iii) That is visibly transporting any aquatic plant material; or

(iv) Upon a reasonable suspicion that an aquatic invasive species may be present.

(e) A peace officer may order the decontamination of a conveyance upon a determination that an aquatic invasive species is present after conducting an inspection as provided in this section.

(f) A peace officer may impound and quarantine a conveyance if:

(i) The peace officer finds that an aquatic invasive species is present after conducting an inspection authorized by this section;

(ii) The person transporting the conveyance refuses to submit to an inspection authorized by this section; or

(iii) The person transporting the conveyance refuses to comply with an order authorized by this section to decontaminate the conveyance.

(g) An impoundment and quarantine of a conveyance may continue for the reasonable period necessary to inspect and decontaminate the conveyance and to ensure that the aquatic invasive species has been completely eradicated from the conveyance or is no longer living.

(h) As provided in this subsection, every conveyance entering the state by land shall be inspected by an authorized aquatic invasive species inspector in accordance with rules established by the commission prior to contacting or entering the waters of this state. The commission shall promulgate rules establishing the dates when such inspections are required and qualifications for authorized inspectors.

(j) The commission, in coordination with the department of transportation, the department of state parks and cultural resources and the department of agriculture, is authorized to establish and inspect conveyances at mandatory aquatic invasive species check stations at ports of entry, other department of transportation facilities located near the borders of this state that meet established state and national safety and commerce requirements for the traveling public or other appropriate facilities.

23-4-204. Rulemaking authority; fees.

(a) The commission and the department of state parks and cultural resources shall promulgate rules to administer and enforce the provisions of this article.

(b) The commission shall establish and collect fees in accordance with the following:

(i) An annual fee shall be collected by the commission for every watercraft before the watercraft enters the waters of the state. Payment of the fees shall be evidenced by a sticker placed on the bow of the watercraft or electronically as determined by commission rule or regulation. No person shall operate nor shall the owner permit the operation of any watercraft on the waters of the state without payment of the fees provided in this section. For purposes of this paragraph, "watercraft" means any contrivance used or designed primarily for navigation on water but does not include personal flotation devices or water sport toys;

(ii) Notwithstanding W.S. 23-4-203(a) and subsection (a) of this section, fees shall be established by commission rule or regulation promulgated in accordance with the Wyoming Administrative Procedure Act;

(iii) Fees shall be established in an amount to ensure that, to the extent practicable, the total revenue generated from the fees collected approximates, but does not exceed, the direct and indirect costs of administering the regulatory provisions required under this article.

(c) Repealed by Laws 2015, ch. 41, § 2.

23-4-205. Penalties.

(a) Any person who violates the provisions of this article or any order under this article is guilty of a high misdemeanor punishable as provided in W.S. 23-6-202(a)(ii).

(b) In addition to any other criminal penalty provided in this section any person who violates any provision of this article, may be assessed civil penalties in an amount not to exceed the costs incurred by the commission and the department of state parks and cultural resources in enforcing the provisions of this article but shall not include costs associated with the eradication of an aquatic invasive species introduced into the waters of this state. The commission or the department of state parks and cultural resources may bring a civil action in any court of competent jurisdiction for civil penalties or injunctive relief.

23-4-206. Reciprocal aquatic invasive species program agreements with adjoining states authorized; water subject to agreements; implementing orders.

(a) The commission is authorized to enter into reciprocal agreements with corresponding state officials of adjoining states for purposes of providing for the recognition of aquatic invasive species programs at least as restrictive as those in Wyoming, for boating by residents of this state and adjoining states upon artificial impoundments of water forming the boundary between this state and adjoining states. The agreements may include provisions by which each state shall honor the aquatic invasive species program fees of the other state. Watercraft operators from the other state shall display proof of payment of the appropriate aquatic invasive species program fee from the other state and any additional reciprocity fee to the state of Wyoming set by mutual agreement of the states.

(b) It is the primary purpose of this section to provide a method whereby the boating opportunities afforded upon artificial impoundments of water forming the boundary between this state and adjoining states may be mutually enjoyed by the residents of Wyoming and the residents of adjoining states.

(c) The commission is authorized to establish orders as provided in this act to implement any agreements under this section.

Appendix J: Wyoming Game and Fish Commission AIS Regulation; Chapter 62.

CHAPTER 62

REGULATION FOR AQUATIC INVASIVE SPECIES

Section 1. Authority. These regulations are promulgated by authority of Wyoming Statutes § 23-1-102, §§ 23-4-201 through 23-4-205.

Section 2. Definitions. Definitions shall be as set forth in Title 23, Wyoming Statutes, Commission regulations, and the Commission also adopts the following definitions:

(a) "Aquatic invasive species" is defined in W.S. § 23-4-201(a) (i). Aquatic invasive species include some species known to be present in Wyoming and species with a high potential to invade, survive and reproduce in Wyoming.

(i) Aquatic invasive species include:

(A) All members of the genus *Dreissena*, including, but not limited to, zebra mussel *D. polymorpha* and quagga mussel *D. rostriformis*;

(B) New Zealand mudsnail - *Potamopyrgus antipodarum*;

(C) Asian clam - *Corbicula fluminea*;

(D) Rusty crayfish - *Orconectes rusticus*;

(E) Brook stickleback - *Culaea inconstans*;

(F) All members of the genus *Hypophthalmichthys*, including, but not limited to, bighead carp *H. nobilis*, silver carp *H. molitrix*, and largescale silver carp *H. harmandi*;

(G) Black carp - *Mylopharyngodon piceus*;

(H) All members of the genera *Channa* and *Parachanna* in the family Channidae (snakeheads);

(I) Hydrilla - *Hydrilla verticillata;*

(J) Eurasian watermilfoil - *Myriophyllum spicatum*; and,

(K) Curly pondweed – *Potamogeton crispus*.

(b) "Authorized inspector" means an authorized aquatic invasive species inspector who has a valid certification from an aquatic invasive species inspection training course that meets the requirements established by the Wyoming Game and Fish Department (Department) to certify inspectors for aquatic invasive species inspections.

(c) "Certified inspection location" means a location or an address where a Department authorized inspector may be available to conduct an inspection.

(d) "Infested water" means a water designated by the Department as having an established population of Dreissenid mussels.

(e) "Mandatory aquatic invasive species check station" means a location established by the Department at Wyoming ports of entry, other Wyoming Department of Transportation facilities that meet established state and national safety and commerce requirements for the traveling public or other appropriate facilities where stopping is mandatory and an authorized inspector may conduct an inspection.

(f) "Positive water" means a water where the presence of any life stage of Dreissenid mussels has been detected in multiple Department sampling events.

(g) "Seal" means a locking device affixed to a conveyance that has been inspected or decontaminated by an authorized inspector.

(h) "Suspect water" means a water where any life stage of Dreissenid mussels has been detected in a single Department sampling event, but not verified by subsequent sampling.

(i) "Seal receipt" means a valid written or electronic document issued by an authorized inspector following an inspection that contains information regarding the conveyance, any action taken by an authorized inspector, and information correlating to an applied seal, if issued.

(j) "Waters of this state" means any waters within the jurisdiction of Wyoming.

Section 3. Draining and Cleaning Watercraft and Conveyances.

(a) Immediately upon removing a watercraft from any waters of this state, the operator shall remove all visible vegetation from the watercraft and trailer and drain all water from the watercraft including, but not limited to, water in the hull, ballast tanks, bilges, live wells and motors.

(i) Containers may be used to transport legally obtained live baitfish or other wildlife by land, but shall not be a part of a watercraft and shall be free of aquatic vegetation.

(b) No live baitfish, mollusks or crustaceans shall be collected from or transported in water taken from any suspect water, positive water or infested water.

(c) All bilge and ballast plugs and other barriers that prevent water drainage from a watercraft shall be removed or remain open while a watercraft is transported by land within the state.

(d) The operator shall drain all water from all conveyances, including construction

and commercial equipment, upon leaving any suspect water, positive water or infested water.

Section 4. Inspection and Decontamination.

(a) Compliance with aquatic invasive species inspection requirements is an express condition of allowing a conveyance to contact any waters of this state.

(i) Any person who refuses to permit inspection of their conveyance or refuses to complete any required removal and disposal of aquatic invasive species shall be prohibited from allowing the conveyance to contact any waters of this state.

(ii) If a person refuses to allow inspection of a conveyance or to complete any required removal and disposal of aquatic invasive species prior to departure from any waters of this state known to contain an aquatic invasive species, the conveyance is subject to impoundment until an aquatic invasive species inspection and decontamination is completed.

(b) All conveyances are subject to inspection upon encountering a mandatory aquatic invasive species check station.

(c) Authorized inspectors may inspect any conveyance. Authorized inspectors shall perform decontaminations at the direction of a peace officer or with the voluntary consent of the person transporting the conveyance.

(d) Inspections shall be conducted by:

(i) any peace officer; or,

(ii) any authorized inspector.

(e) Once a conveyance is inspected or decontaminated, a seal may be affixed to the conveyance by a peace officer or authorized inspector. A copy of the completed seal receipt shall accompany all seals. The person transporting a conveyance sealed by an authorized inspector may remove the seal at their discretion. The Department may recognize a properly affixed seal applied by an authorized inspector from a state or province with a Department approved aquatic invasive species inspection and decontamination program if the seal is accompanied by a valid seal receipt. It shall be a violation of this regulation for any person to attempt to reattach any seal once it is removed from a conveyance.

(f) A seal receipt indicating the type of decontamination procedure performed shall serve as proof of decontamination.

(g) Any person transporting a conveyance into the state by land, shall have the conveyance inspected by an authorized inspector prior to contacting any waters of this state, unless exempted by (i) or (ii) below.

(i) Any person transporting a conveyance from March 1 through November 30 that has not been in contact with a suspect water, positive water or infested water within the past thirty (30) days and who did not encounter a mandatory aquatic invasive species check

station prior to reaching any of the waters of this state may launch without inspection if in possession of a seal receipt. The seal receipt shall be retained while on the water.

(ii) Any person transporting a conveyance from December 1 through the last day of February that has not been in contact with a suspect water, positive water or infested water within the past thirty (30) days and who did not encounter a mandatory aquatic invasive species check station prior to reaching any of the waters of this state may launch without inspection.

(h) As part of all inspections, all compartments, equipment, and containers that may hold water, including, but not limited to, live wells, ballast and bilge areas shall be completely drained as directed by authorized inspectors.

(i) A conveyance suspected to contain an aquatic invasive species shall be decontaminated before said conveyance shall be allowed to contact any waters of this state.

(j) Decontaminations shall be conducted only by those authorized inspectors that have received additional Department training to conduct decontaminations and are specifically authorized to do so.

(k) Any person operating a conveyance may be ordered to remove the conveyance from any of the waters of this state or any conveyance staging area by any peace officer if there is reason to believe the conveyance may contain aquatic invasive species or was not properly inspected prior to contacting the water. Once removed from the water, the conveyance shall be subject to inspection and decontamination for the removal and disposal of aquatic invasive species.

Section 5. Impoundment and Quarantine.

(a) A peace officer may impound and quarantine a conveyance as provided in W.S. § 23-4-203.

(b) If the person in charge of the conveyance is not the registered owner, the registered owner shall be notified by mail, return receipt requested, within ten (10) days of the location of the impounded conveyance. Such notification shall also include contact information for the peace officer ordering the impoundment. If the registered owner is present when the conveyance is ordered impounded, then the same information shall be provided to the registered owner at the time the impound order is issued.

(c) All impounded conveyances shall be held at the risk and expense of the owner. A conveyance held under impound for non-compliance with this regulation shall only be released after a peace officer is satisfied by inspection or quarantine that the conveyance is no longer a threat to the aquatic resources, water supplies, and water infrastructure of the state.

(d) Duration of conveyance quarantine shall be determined by the Department, shall be sufficient to allow decontamination, and shall not exceed thirty (30) days.

(e) An impounded conveyance shall not be released until a Department impound release form is signed and executed by a peace officer. It is the responsibility of the owner to coordinate with the Department for the release of the conveyance.

Section 6. Mandatory Reporting of Aquatic Invasive Species.

(a) Any person who knows that an unreported aquatic invasive species is present at a specific location in Wyoming shall report the aquatic invasive species presence within forty-eight (48) hours to the Commission, the Department, or any peace officer and shall provide the date and time of the detection of the aquatic invasive species, the exact location of sighting (water body and specific location on the water body), the suspected species~~,~~ and the name and contact information of the reporter.

Section 7. Aquatic Invasive Species Program Decal.

(a) An aquatic invasive species program fee may be assessed as part of the Department's motorized watercraft registration fee. A current, properly affixed combination motorized watercraft registration and Aquatic Invasive Species Program Decal shall be proof of payment of this fee. Proof of combination decal purchase may be used in lieu of a properly affixed decal for up to fifteen (15) days from date of purchase.

(b) All owners or operators of motorized watercraft registered outside of Wyoming, any owners or operators of Wyoming registered watercraft that have not paid the aquatic invasive species program fee as part of their watercraft registration fee and all owners or operators of non-motorized watercraft shall purchase an Aquatic Invasive Species Program Decal valid for the current calendar year prior to contacting any waters of this state. Purchase of this decal shall be evidenced by an Aquatic Invasive Species Program Decal properly affixed to the watercraft. Proof of decal purchase may be used in lieu of a properly affixed decal for up to fifteen (15) days from date of purchase. For the purpose of this Section, all non-motorized inflatable watercraft ten (10) feet in length or less are exempt from this decal provision.

(c) The price of the decal shall be ten dollars ($10) for motorized watercraft registered in Wyoming and thirty dollars ($30) for motorized watercraft registered outside of Wyoming. The price of the decal shall be five dollars ($5) for non-motorized watercraft owned by a Wyoming resident and fifteen dollars ($15) for non-motorized watercraft owned by a nonresident.

(i) An Aquatic Invasive Species Program Decal affixed to a motorized watercraft shall be displayed on the starboard (right) side of the bow six (6) inches left of and directly in line with the watercraft registration decal. Decals affixed to non-motorized watercraft shall be displayed on the bow in a manner such that the decal is visible when the watercraft is underway. Only the Aquatic Invasive Species Program Decal which is currently valid shall be displayed.

(ii) In the case of rental watercraft, it shall be the responsibility of the rental watercraft owner to ensure that a valid Aquatic Invasive Species Program Decal is properly displayed on the watercraft.

(d) Owners of multiple non-motorized watercraft may transfer valid decals between their own non-motorized watercraft, however, each non-motorized watercraft shall display a valid decal while contacting any of the waters of this state.

WYOMING GAME AND FISH COMMISSION

Keith Culver, President

Dated: July 20, 2017